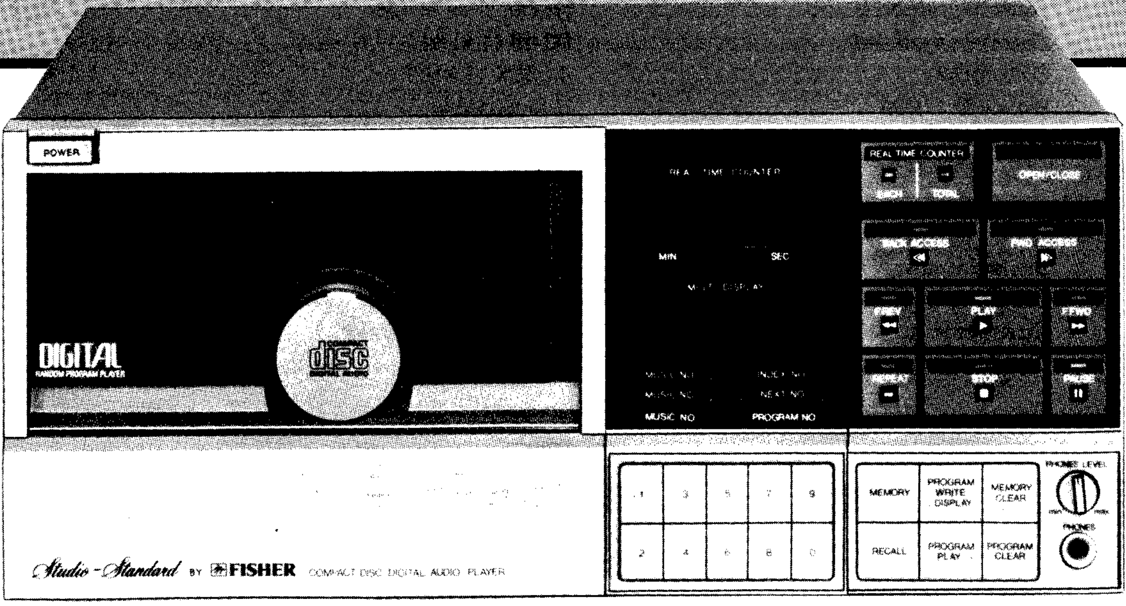
SERVICE MANUAL

FISHER

AD 800

(EUROPE)

Compact Disc Player


POWER
DIGITAL
RANDOM PROGRAM PLAYER
REAL TIME COUNTER
MIN
SEC
MULTI DISPLAY
MUSIC NO
INDEX NO
NEXT NO
PROGRAM NO
EACH
TOTAL
OPEN/CLOSE
BACK ACCESS
FWD ACCESS
PREV
PLAY
FFWD
REPEAT
STOP
PAUSE
1
3
5
7
9
2
4
6
8
0
MEMORY
PROGRAM WRITE DISPLAY
MEMORY CLEAR
RECALL
PROGRAM PLAY
PROGRAM CLEAR
PHONES LEVEL
min
max
PHONES
Studio-Standard BY FISHER COMPACT DISC DIGITAL AUDIO PLAYER

WM-10175

CONTENTS

1. SPECIFICATIONS 1
2. HANDLING THE COMPACT DISC PLAYER 2
3. BEFORE REPAIRING THE COMPACT DISC PLAYER 3
4. HANDLING THE PICKUP 4
5. LASER BEAM SAFETY PRECAUTIONS 8
7. EXPLANATION OF THE COMPACT DISC (CD) PLAYER SYSTEM 11
8. REPLACEMENT OF PICKUP AND SPINDLE MOTOR 14
9. PARTS LOCATION 17
10. COMPACT DISC PLAYER ADJUSTMENTS 18
11. PRINTED CIRCUIT BOARD CONNECTIONS 31
12. BLOCK DIAGRAM (FOR ADJUSTMENT) 32
13. CABINET EXPLODED VIEW 33
14. CHASSIS EXPLODED VIEW 34
15. PARTS LIST 35
16. MECHANISM EXPLODED VIEWS 41
17. MECHANISM PARTS LIST 43
18. BLOCK DIAGRAM 44

APPENDIX
A. { SCHEMATIC DIAGRAM ① (DIGITAL/AUDIO/POWER SUPPLY)
WIRING DIAGRAM ② (PICKUP/SERVO/SYSTEM CONTROL/DISPLAY)

B. { SCHEMATIC DIAGRAM ② (PICKUP/SERVO/SYSTEM CONTROL/DISPLAY)
WIRING DIAGRAM ① (DIGITAL/AUDIO/POWER SUPPLY)

SPECIFICATIONS

Audio

Channels	2 channels
Frequency response	5 – 20,000 Hz
Dynamic range	greater than 90 dB
Channel separation	90 dB (1 kHz)
Distortion	0.006% (1 kHz)
Wow and flutter	Undetectable
Outputs	Output: 1.4 V/470 ohms Phones: 15 mW (at 8 ohms) (impedance range: 8 ohms – 10 kohms)

Signal format

Sampling frequency	44.1 kHz
Quantization	16 bits linear/channel
Transmission rate	4.3218 Mbit/sec.

Pickup

System	Objective drive system light pickup
Objective drive system	2-dimensional parallel drive
Light source	Semiconductor laser
Wave length	790 nm

General

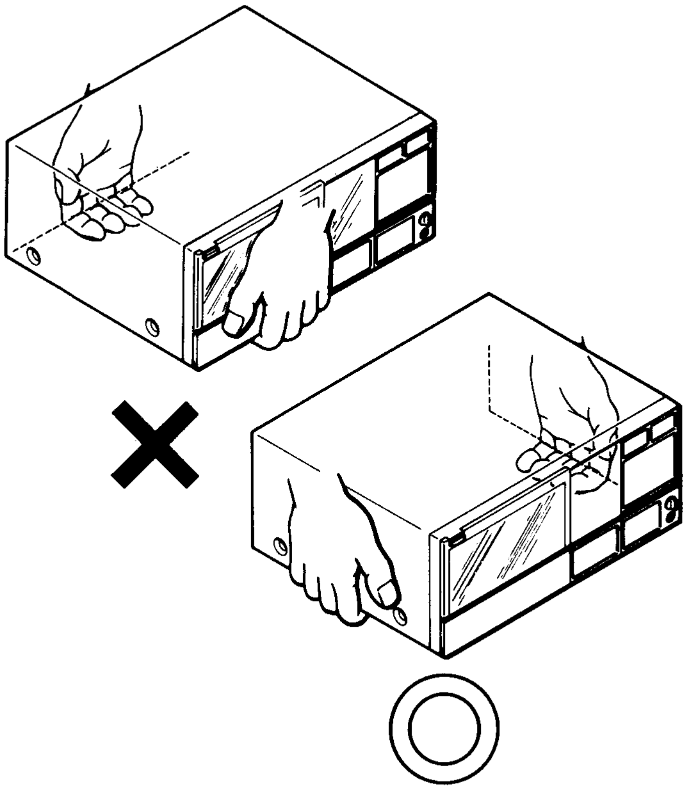
Power supply	AC 110/220 V, 50 Hz
Power consumption	35 W
Dimensions (approx.)	335 (W) x 140 (H) x 270 (D) mm (13-1/4" x 5-1/2" x 10-3/4")
Weight (approx.)	6.8 kg (15 lbs)

* Specifications and design subject to change without notice.

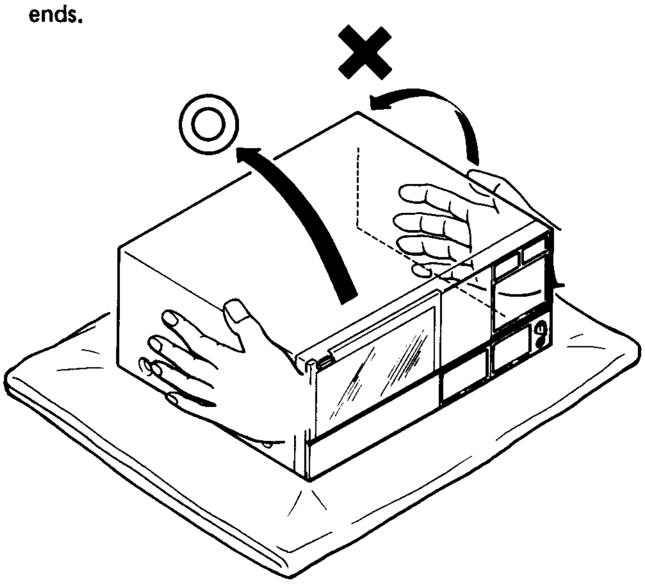
2. HANDLING THE COMPACT DISC PLAYER

(1) Handling

a. Many of the parts within the compact disc player must perform very precise operations.
Extra care should be taken during shipping and unpacking of this unit.
Take care not to touch the front panel, especially the disc holder and disc cover when lifting the unit.



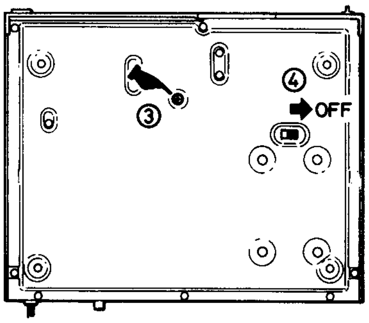
b. Because the delicate pick-up mechanism operates laterally, be careful not to rotate the unit in an end-to-end direction.
If the unit must be turned over, hold both end panels and turn the unit over with the hands holding the ends.



(2) Unpacking

a. Place a soft carpet, cushion or similar material on the table top or other surface.

b. Taking care to handle the unit as cautioned in item (1) – b above, turn the unit over and place it on the carpet.



c. Loosen the screw (red) used for shipping. (③)

d. Move the switch for securing the pick-up to the "OFF" position. (④)

e. Carefully turn the unit back over so that it's right side up.

f. Connect the power cord and set the power switch to the "ON" position.

g. Press the OPEN/CLOSE switch and insert a disc.

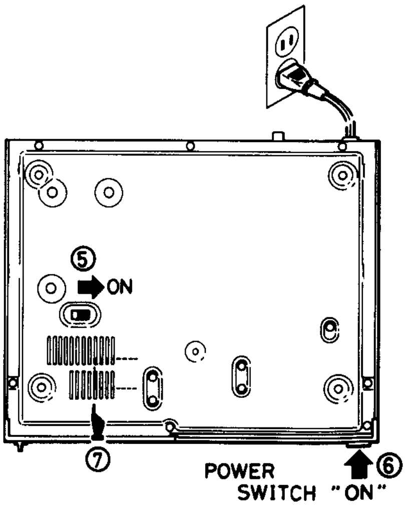
(3) Shipment

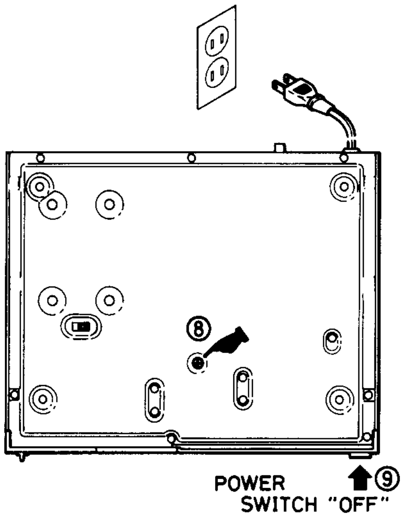
a. Remove the compact disc from the unit.

b. Set the power switch to the "OFF" position and disconnect the power cord.

c. Place a carpet or cushion on the surface.

d. Turn the unit upside down carefully.





e. Move the switch to secure the pick-up to the "ON" position.(⑤)
f. Connect the power cord and set the power switch to the "ON" position.(⑥)
g. The shield case for the pick-up will automatically stop when it reaches the fourth ventilation hole from the right. (⑦)
h. Tighten the screw (red) used for shipping.(⑧)
i. Set the power switch to "OFF" and disconnect the power cord.(⑨)

* Note; that touching the switch for securing the pick-up while the pick-up is moving in step (g). will cause the pick-up to stop moving and not be moved again by the circuit (microcomputer).
In this case, move the power switch once to "OFF" and then back to "ON" ; the step (g). operation will then start again.

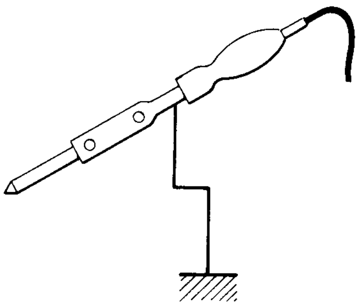
3. BEFORE REPAIRING THE COMPACT DISC PLAYER

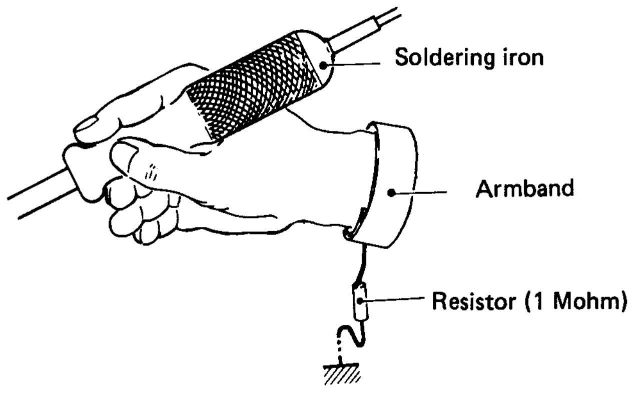
(1) Preparations

a. Many ICs, LSI and the pick-up (laser diode) are used in the compact disc player. These components are sensitive to static electricity, and might be damaged by static electricacity or high voltage, so particular care should be taken regarding this point.

b. Many precision componets and the lens are used in the pick-up.
Never attempt to make repairs, or to store parts, where the temperature or humidity is high, where magnetism is strong, or where there is much dust.

(2) Notes regarding repairs





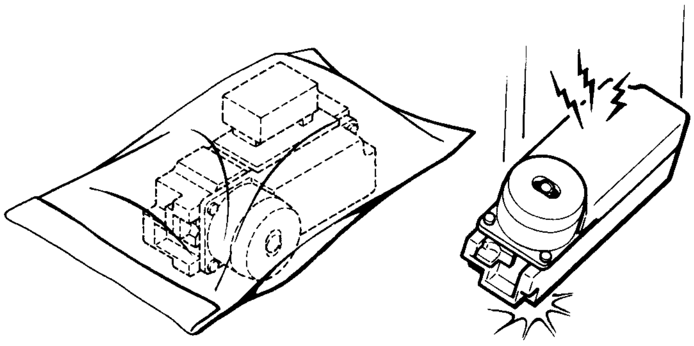
a. Be sure to first disconnect the power plug before attempting to replace any component.
b. All tools, instruments, etc., used for measuring must be grounded.
Grounding can be accomplished by using a conductive metal sheet on the work bench.
c. To prevent AC leakage of the soldering iron, ground its metal part.
d. Repair personnel must be grounded.
e. Do not look directly at the laser beam coming from the pickup or allow it to strike against your fingers, skin etc.

4. HANDLING THE PICKUP

(1) Shipping and storage cautions

a. The pick-up must be stored in a conductive bag until immediately prior to its use.

b. Do not drop it or subject it to impacts.



Conductive bag

(2) Repair cautions

a. Be sure to carefully follow the instructions and caution " BEFORE REPAIRING THE COMPACT DISC PLAYER ".

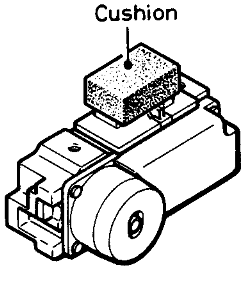
b. The precautions below have been taken in order to prevent damage to the pick-up due to static electricity during transportation.

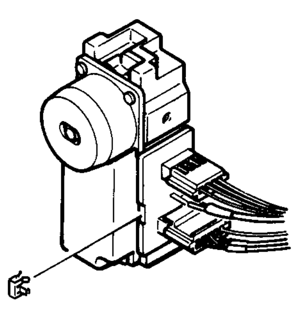
  (a) It is in a conductive bag.

  (b) A conductive "cushion" is attached at the printed-circuit board terminals. Remove this cushion before connecting the socket.

  (c) A clamp pin is attached to the laser diode terminals for short-circuiting.
  Do not remove this clamp pin until all steps for replacement of the pick-up have been completed.

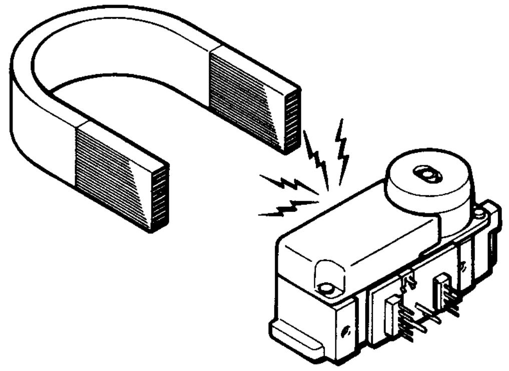
Conductive cushion attached over terminals



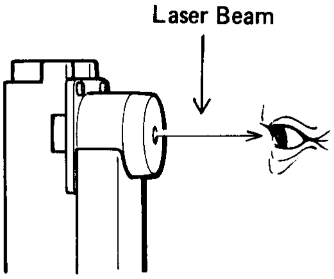


Clamp pin for short-circuiting

c. A strong magnet is used in the pick-up.
Do not bring a magnet or other magnetized object near to it.



d. Eyes may be injured if the laser beam enters.
Take great care to be absolutely sure that the laser beam never enters the eyes.
Do not apply power if there is a broken part in the laser output section of the pickup.

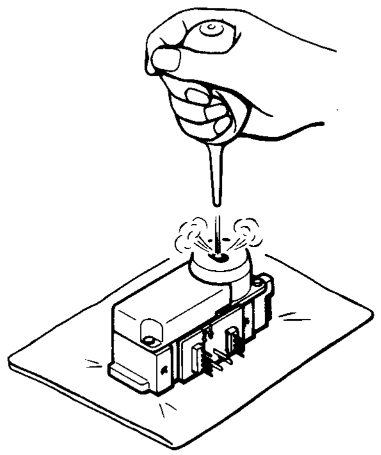


> Do not look directly at the laser beam coming from the pickup or allow it to strike against your fingers, skin, etc.

e. Cleaning the lens

  (a) If dust gets on the lens, clean it away by using an air brush such as used for a camera lens.

  (b) The lens is held in place by a spring.
  If the center of the lens is dirty, carefully clean by applying a lens cleaning liquid on a cotton swab or similar soft material, and using this to clean, taking care not to bend the lens spring.



f. Do not attempt to disassemble the pick-up.

5. LASER BEAM SAFETY PRECAUTIONS

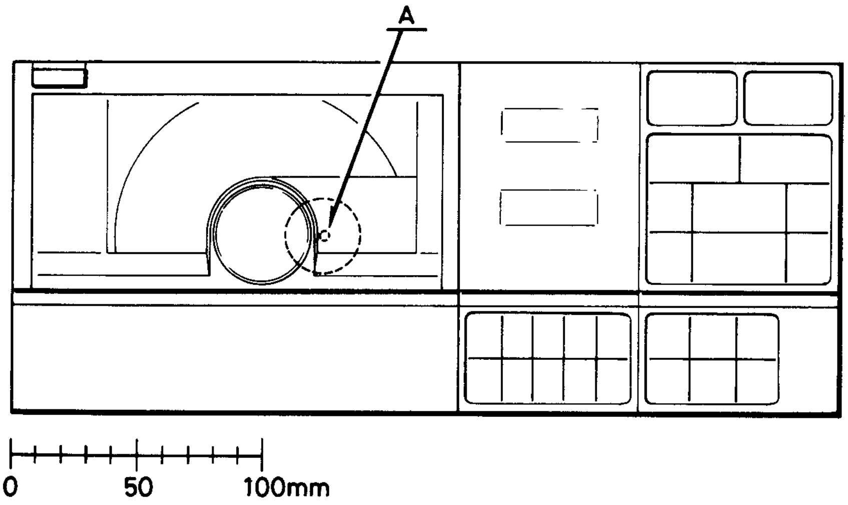
SAFETY INTERLOCK

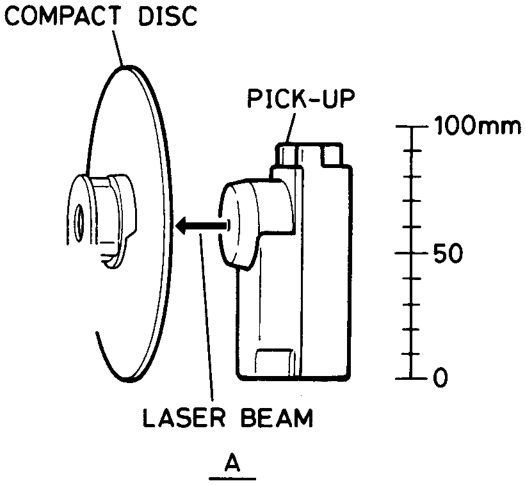
a. The pickup used in the compact disc player emits a laser beam.

INVISIBLE LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM.

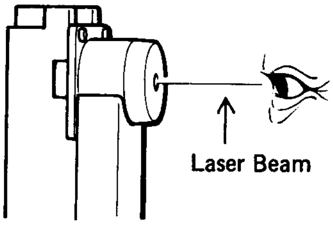
MAXIMUM OUTPUT	**1.0 mW**
WAVE LENGTH IS FROM	**775 nm~TO 830 nm**

b. The laser beam is emitted where shown in the illustration.





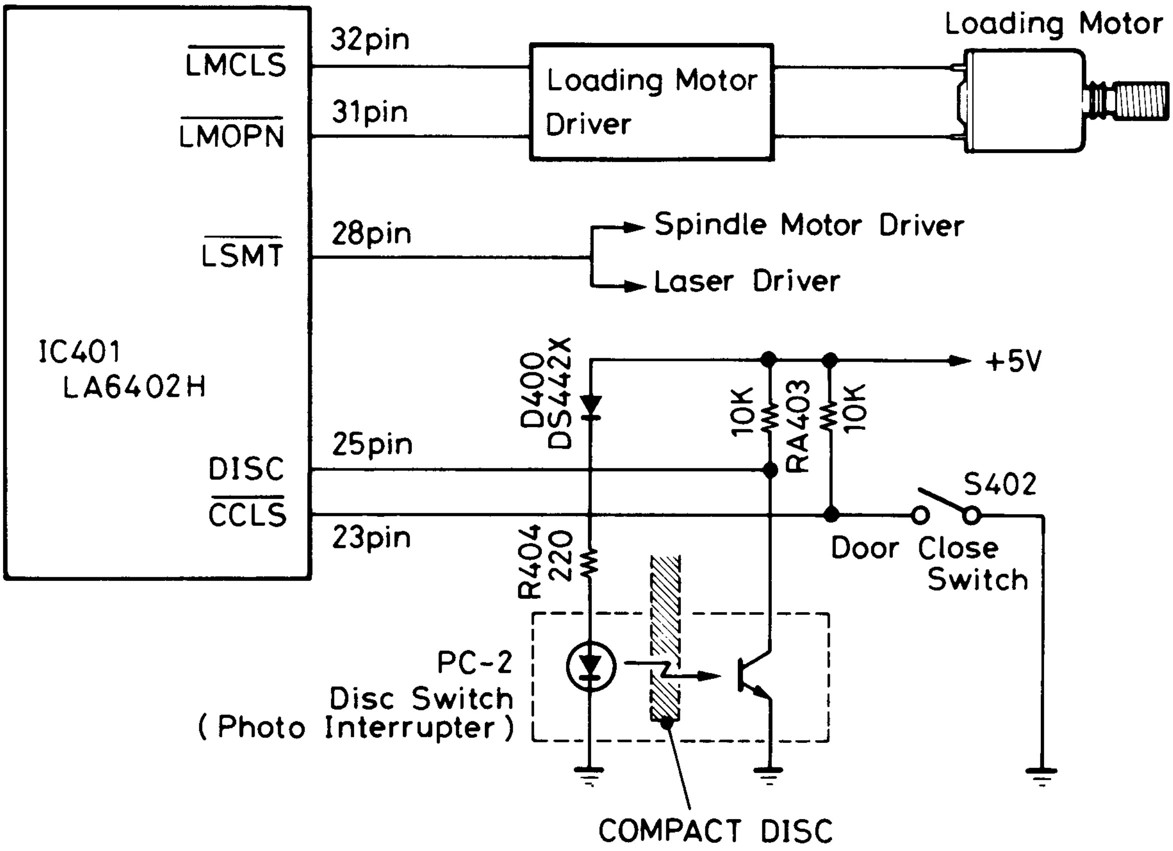
c. If the disc cover is removed in order to perform service, the pickup is exposed.
Do not look at the pickup with the power switch ON.



Do not look directly at the laser beam coming from the pickup or allow it to strike against your fingers, skin, etc.

Do not apply power if there is a broken part in the laser output section of the pickup.

d. Safety interlock circuitry



LMCLS
LMOPN
LSMT
IC401
LA6402H
DISC
CCLS
32pin
31pin
28pin
25pin
23pin
Loading Motor Driver
Loading Motor
Spindle Motor Driver
Laser Driver
D400
DS442X
+5V
10K
RA403
10K
S402
Door Close Switch
R404
220
PC-2
Disc Switch
(Photo Interrupter)
COMPACT DISC

Fig. 1 Safety Interlock Circuit Diagram

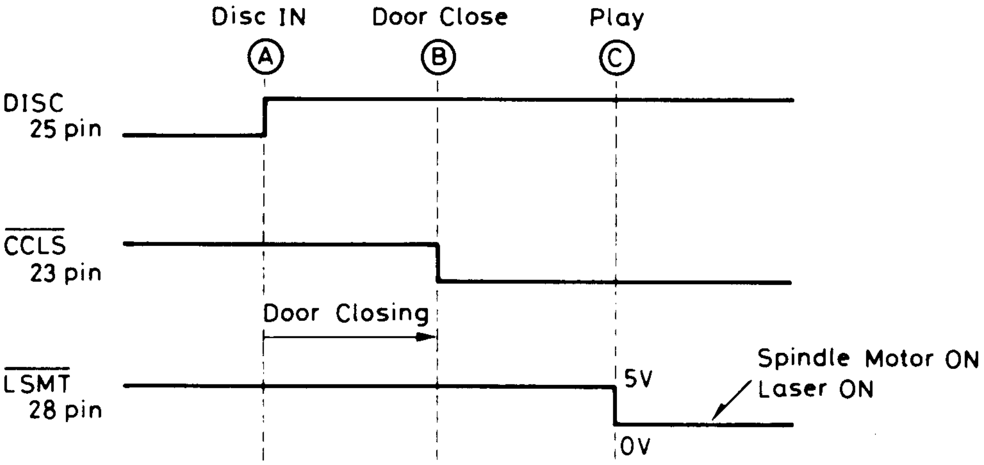


Fig. 2 Time Chart of IC pins

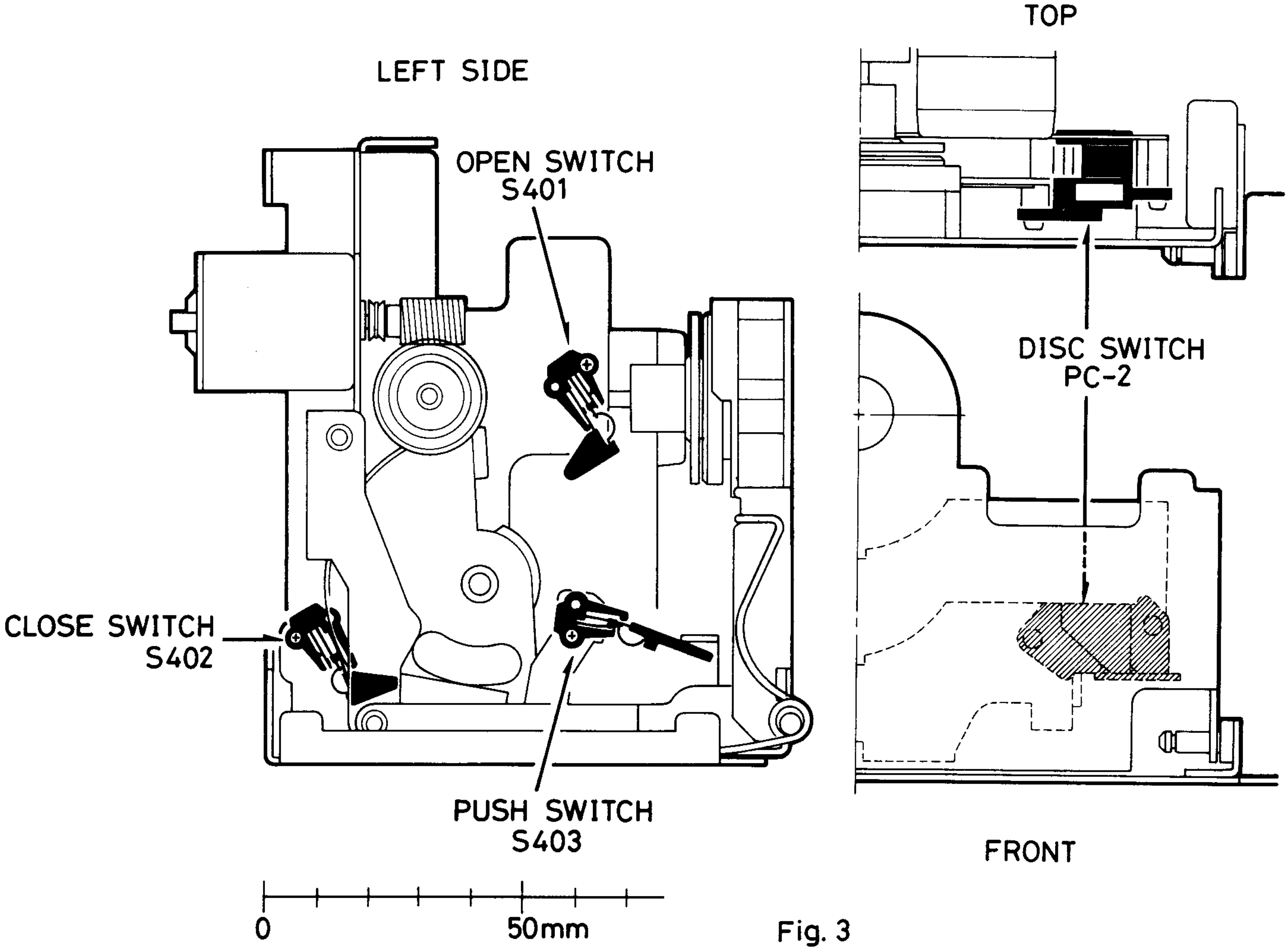


Fig. 3

Explanation of Fig. 1 (IC401 : microcomputer IC)

CCLS	(23–pin):	Indicates whether or not the disc holder is completely closed. (LOW active)
DISC	(25–pin) :	Indicates whether or not a compact disc is in the disc holder. (HIGH active)
LSMT	(28–pin) :	Emits a signal to switch the spindle motor and the laser ON. (LOW active)
LMOPN	(31–pin) :	Rotates the loading motor in the direction to open the disc holder. (LOW active)
LMCLS	(32–pin) :	Rotates the loading motor in the direction to close the disc holder. (LOW active)

EXPLANATION OF OPERATION

1. First, it will be presumed that the disc holder is open, but the compact disc is not in it.
2. When a compact disc is inserted into the disc holder, the light beam from the photo-interrupt (PC-2) LED in Fig. 1 is interrupted.
   Because of this interruption, current stops flowing to the photo-transistor of the photo-interrupt (PC-2).
   As a result, the DISC terminal (25-pin) of IC401 becomes " H " (HIGH). (Fig. 2-A)
3. When the compact disc is set, the LMCLS terminal (32-pin) of IC401 becomes " L " (LOW).
   (LMOPN of IC401 remains " H ".)
   As a result, the loading motor rotates and the disc holder begins closing.
   When the disc holder closes, the door-close switch (S402) switches ON.
   The CCLS terminal (23-pin) of IC401 becomes " L" . (Fig. 2-B)
4. Then, when a key switch (PLAY, PAUSE, F REV, F FWD, BACK ACCESS or FWD ACCESS) is pressed, the LSMT terminal (28-pin) of IC401 outputs an "L" signal.
   Then the spindle motor is rotated, and the laser beam is emitted from the pickup. (Fig. 2–C).

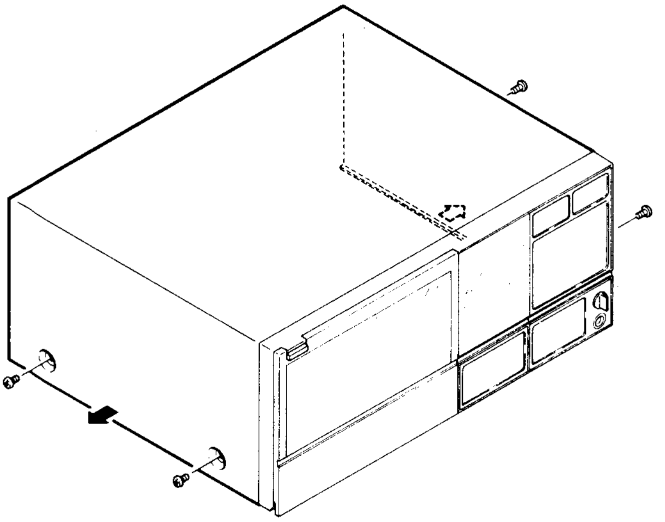
Summary

A. A,compact disc is loaded.
B. The disc holder is completely closed.
C. One of the key switches (PLAY, PAUSE, F REV, F FWD, BACK ACCESS or FWD ACCESS) is pressed.

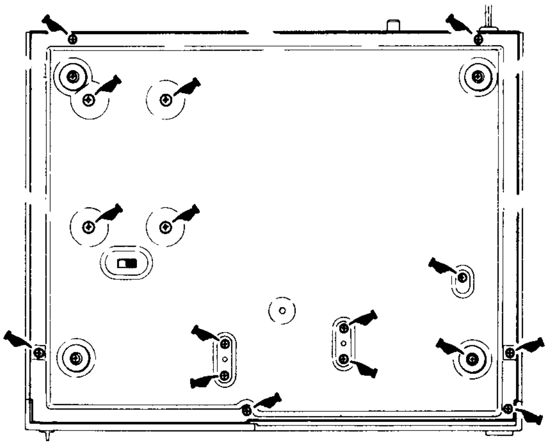
The laser beam will not be emitted from the pickup unless all three conditions (A, B, C) are satisfied.

6. HOW TO DISASSEMBLE THE UNIT

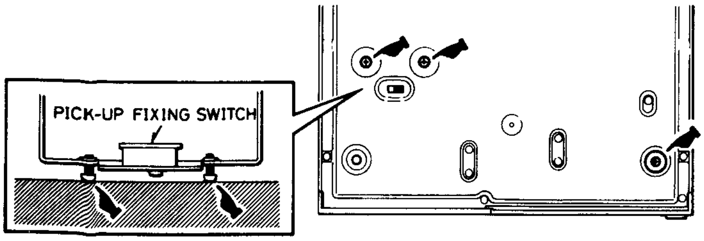
REMOVAL OF CABINET



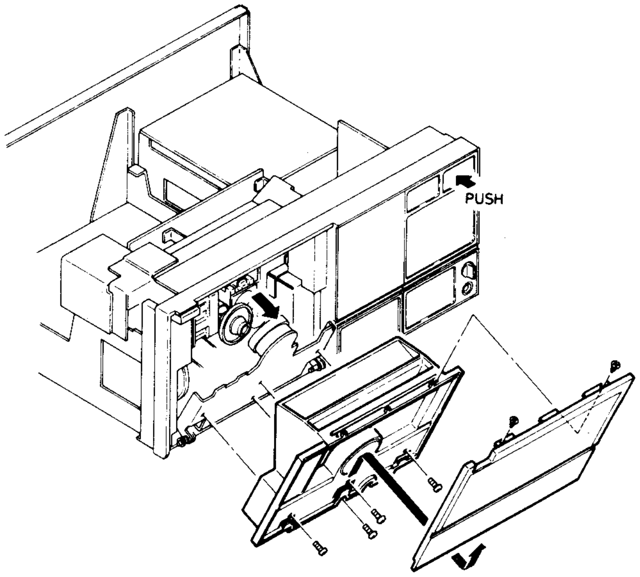
REMOVAL OF BOTTOM LID



The switch for securing the pick-up projects, and thus must be protected if the bottom cover is removed.
As shown in the figure, protect it by using the screws and a stand before turning it over.

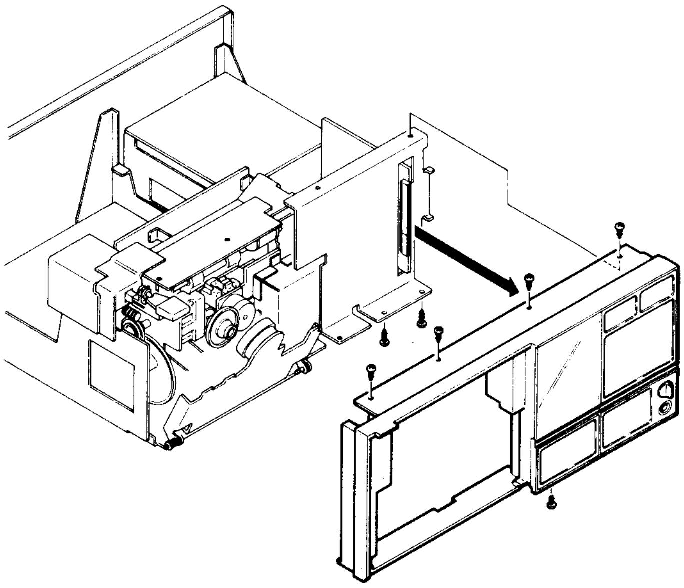


REMOVAL OF DISC COVER

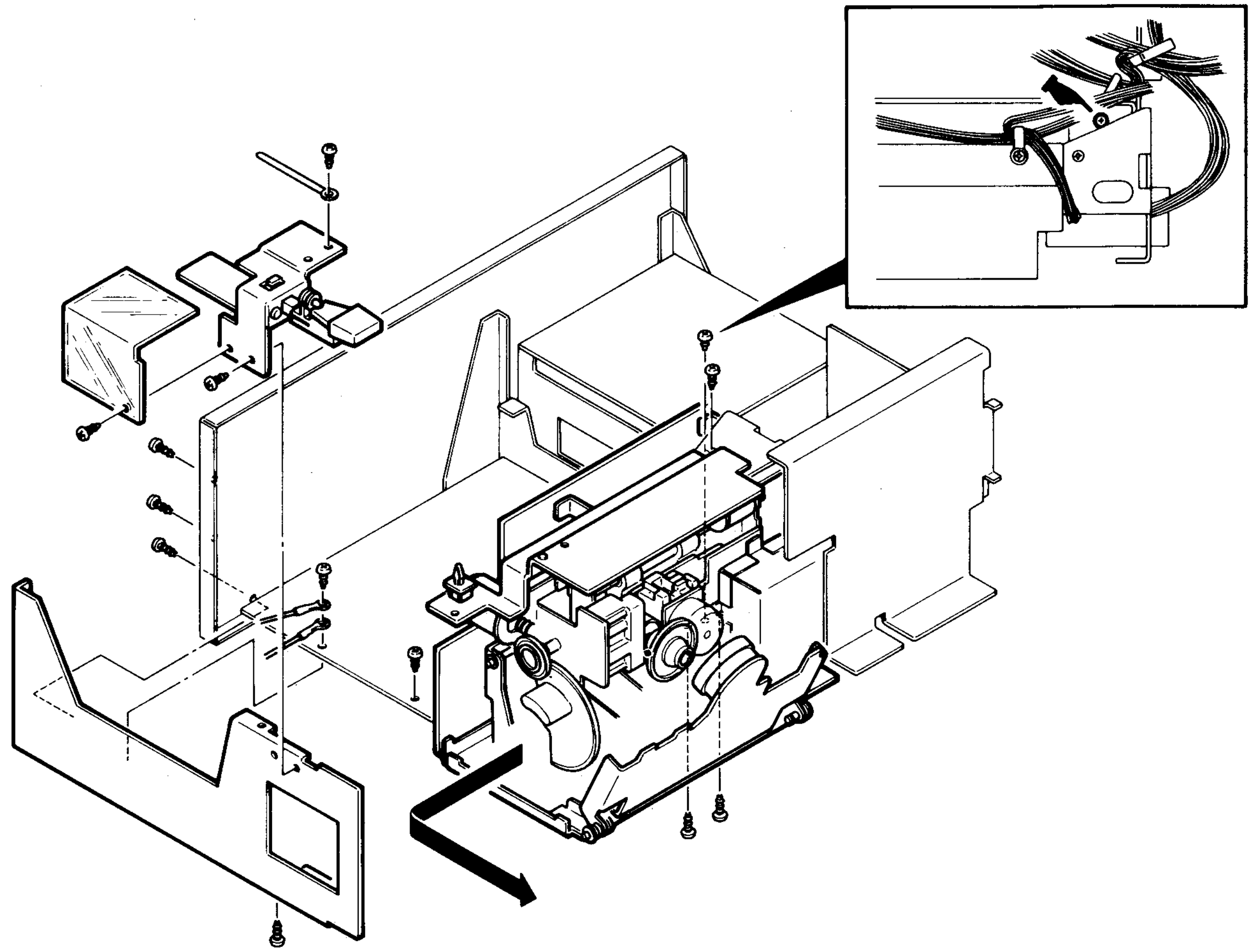


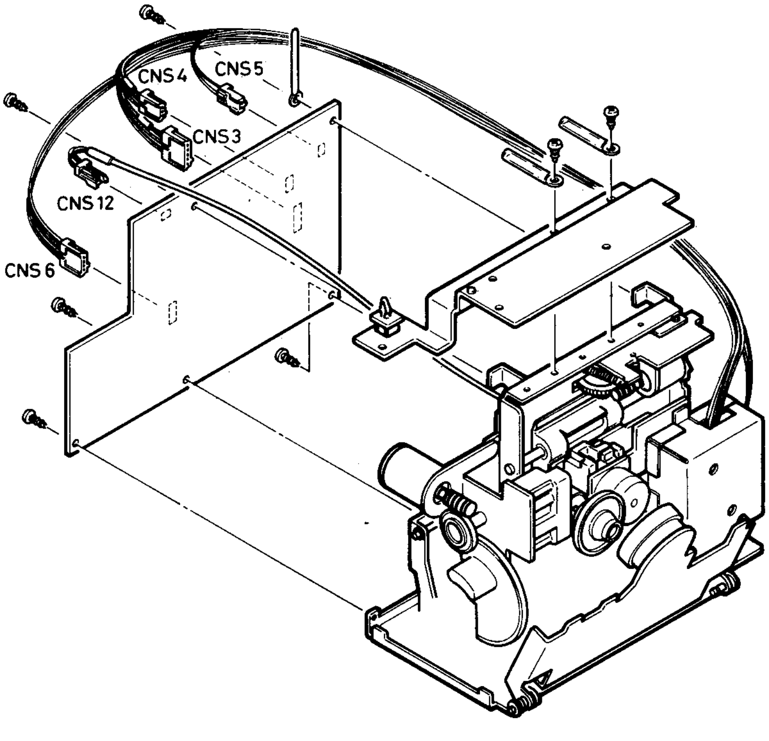
(1) Switch the POWER switch "ON".
(2) Press the OPEN/CLOSE switch; the disc cover will start to open.
(3) Switch the POWER switch "OFF".
(4) Remove the screws holding the disc cover, and lift up the disc cover to remove it.

REMOVAL OF FRONT PANEL

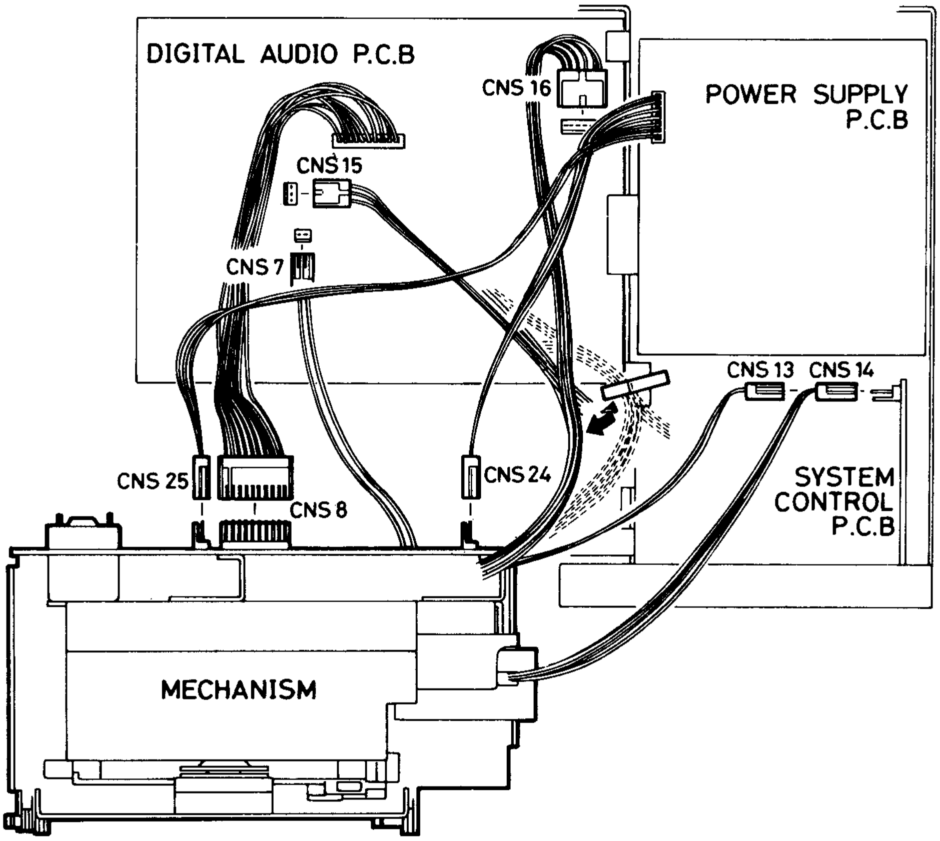


REMOVAL OF MECHANISM




CNS4
CNS5
CNS3
CNS12
CNS6

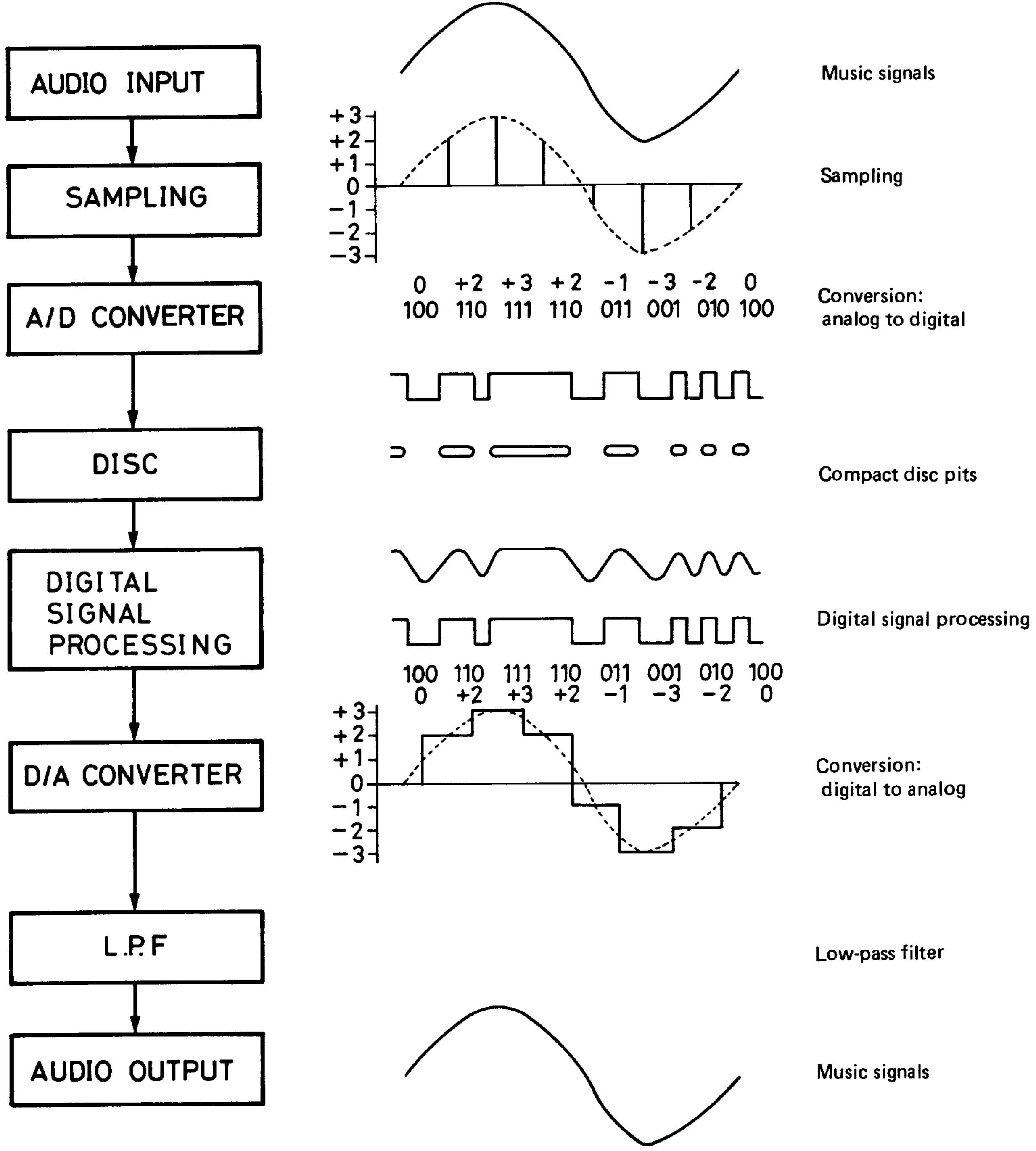
REMOVAL OF MECHANISM (CONNECTOR)

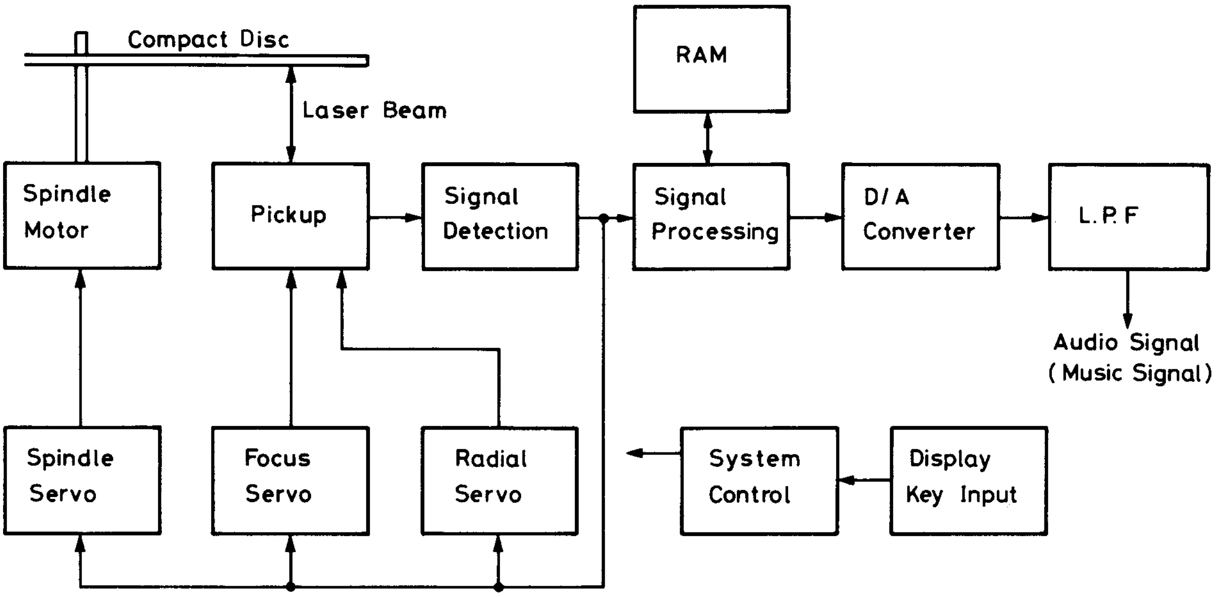

DIGITAL AUDIO P.C.B
CNS 16
POWER SUPPLY P.C.B
CNS 15
CNS 7
CNS 13
CNS 14
SYSTEM CONTROL P.C.B
CNS 25
CNS 8
CNS 24
MECHANISM

7. EXPLANATION OF THE COMPACT DISC (CD) PLAYER SYSTEM

CD system
- Compact disc — A transparent plastic disc on which digital signals are recorded after conversion from music signals.
- Compact disc player — Converts the digital signals detected by the reflection of a laser beam applied to the disc back to the original music signals.

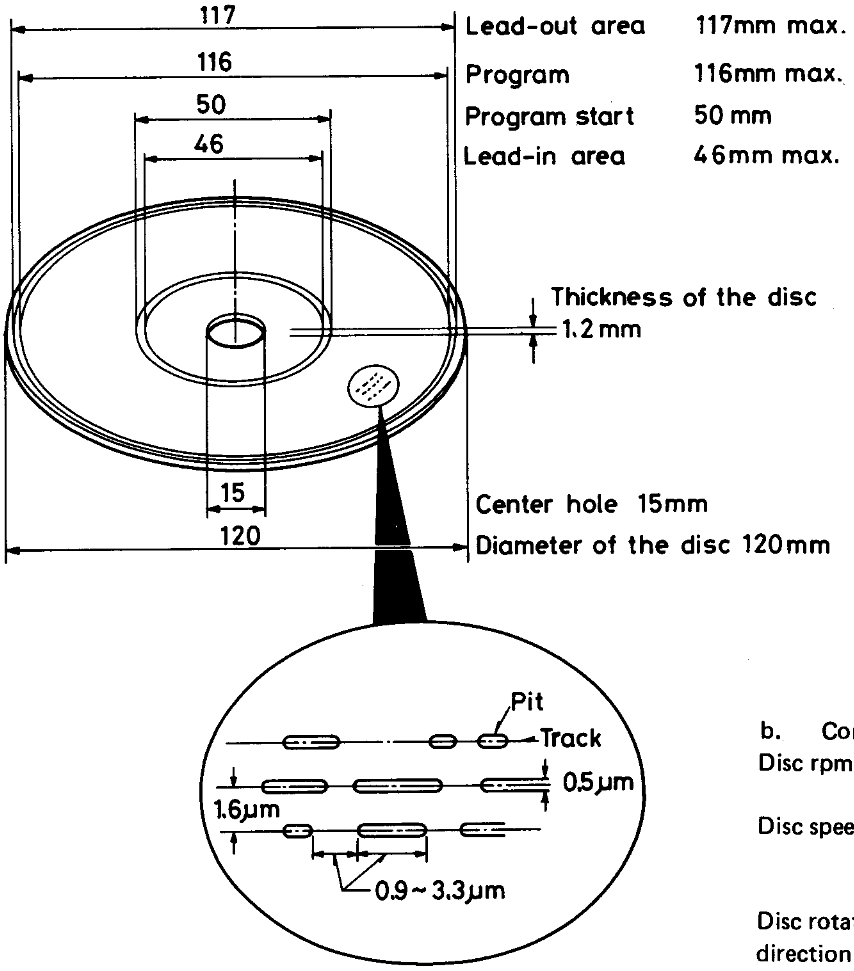
(1) Compact disc player fundamentals and block diagram


AUDIO INPUT
SAMPLING
A/D CONVERTER
DISC
DIGITAL SIGNAL PROCESSING
D/A CONVERTER
L.P.F
AUDIO OUTPUT
Music signals
+3
+2
+1
0
−1
−2
−3
Sampling
0 +2 +3 +2 −1 −3 −2 0
100 110 111 110 011 001 010 100
Conversion: analog to digital
Compact disc pits
Digital signal processing
100 110 111 110 011 001 010 100
0 +2 +3 +2 −1 −3 −2 0
+3
+2
+1
0
−1
−2
−3
Conversion: digital to analog
Low-pass filter
Music signals


Compact Disc
Laser Beam
RAM
Spindle Motor
Pickup
Signal Detection
Signal Processing
D/A Converter
L.P.F
Audio Signal (Music Signal)
Spindle Servo
Focus Servo
Radial Servo
System Control
Display Key Input

(2) The compact disc

a. Compact disc dimensions


117
116
50
46
Lead-out area 117mm max.
Program 116mm max.
Program start 50 mm
Lead-in area 46mm max.
Thickness of the disc 1.2 mm
15
120
Center hole 15mm
Diameter of the disc 120mm
Pit
Track
0.5μm
1.6μm
0.9 ~ 3.3μm

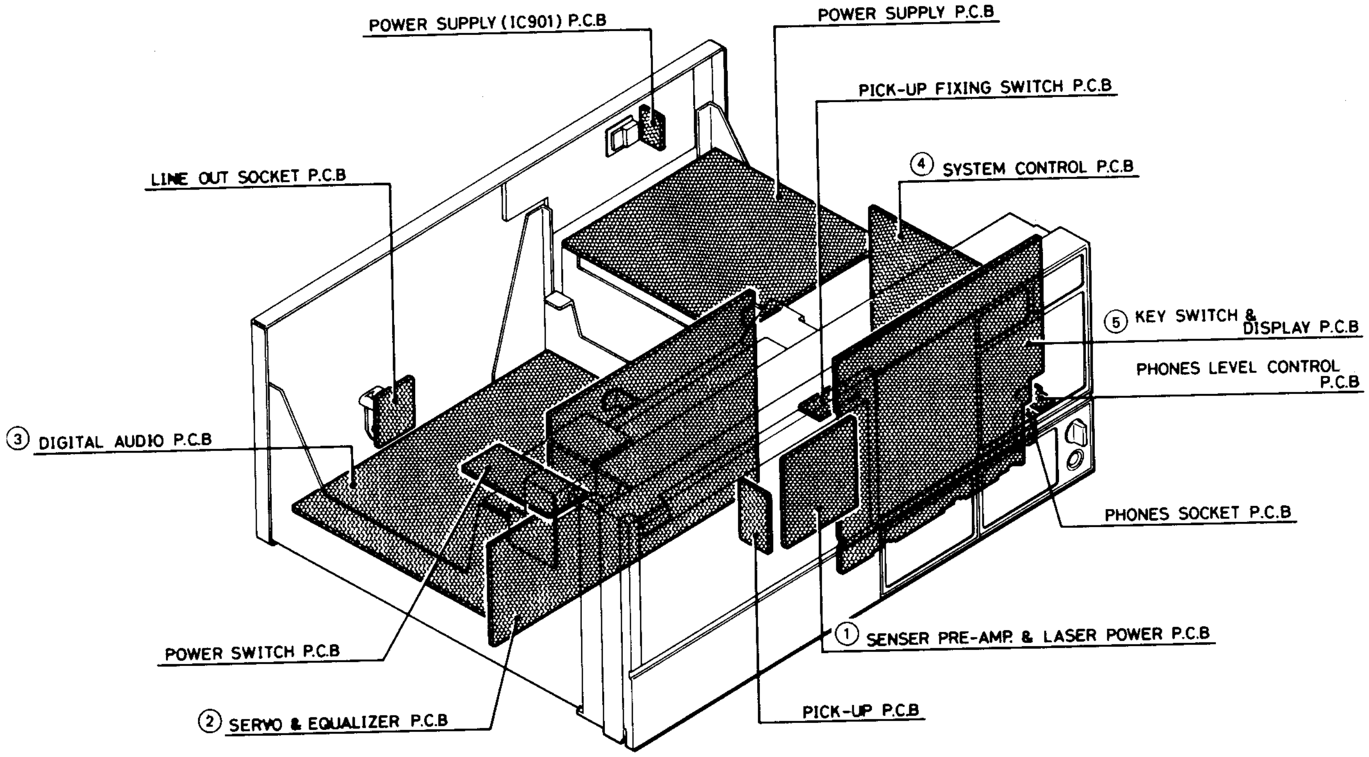
b. Compact disc rotation

Disc rpm: Approx. 500 ~ 200 rpm
(inner track ~ outer track)

Disc speed: 1.2 ~ 1.4 m/sec.
(normally 1.25 m/sec.)
CLV (Constant Linear Velocity)

Disc rotation direction: Counterclockwise (read-out side)

(3) Compact disc player printed-circuit boards


POWER SUPPLY (IC901) P.C.B
POWER SUPPLY P.C.B
PICK-UP FIXING SWITCH P.C.B
④ SYSTEM CONTROL P.C.B
LINE OUT SOCKET P.C.B
⑤ KEY SWITCH & DISPLAY P.C.B
PHONES LEVEL CONTROL P.C.B
③ DIGITAL AUDIO P.C.B
PHONES SOCKET P.C.B
① SENSER PRE-AMP. & LASER POWER P.C.B
POWER SWITCH P.C.B
② SERVO & EQUALIZER P.C.B
PICK-UP P.C.B

① Senser pre-amp. & Laser power board

Power supply to laser diode of pickup and circuit for amplification of signal from pickup sensor.

② Servo & Equalizer board

(a) Focus servo ------ Adjust distance (focus) of lens (in pickup) from disc surface.

(b) Radial servo ------ Moves lens (in pickup) to adjust it to 90° angle with disc tracks, so that lens is focused on the pits.
(Tracking servo)

(c) Spindle motor driving

(d) Equalizer & comparator

③ Digital audio board

(a) Spindle servo ------ Controls rpm of spindle •motor (for disc rotation) to constant linear velocity.

(b) Analyzes all information recorded on the disc and converts it back to the original signals.

④ System control board.

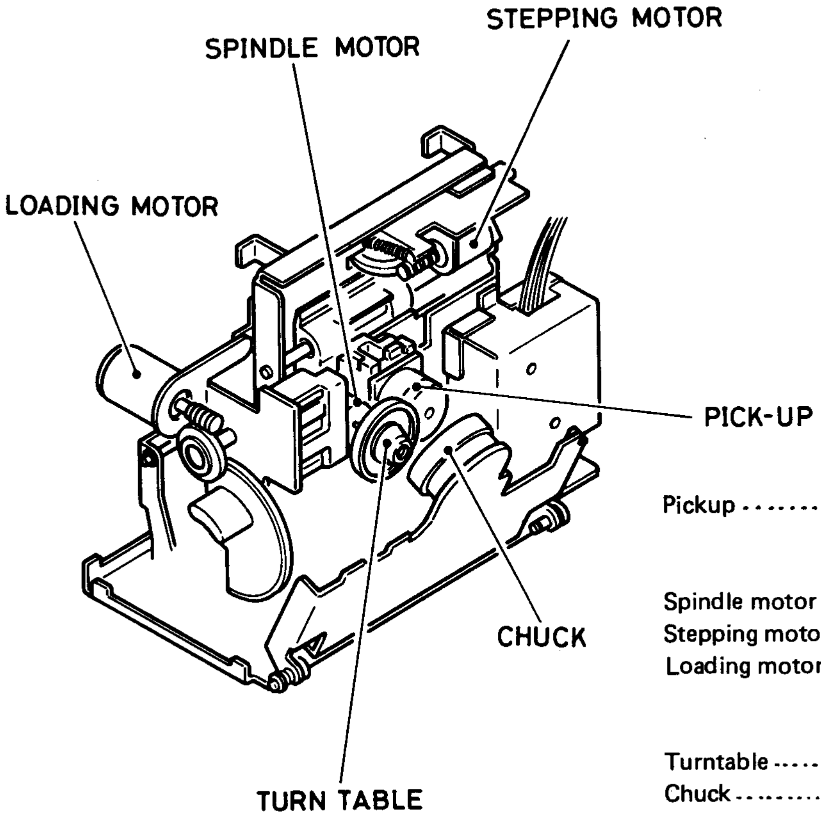
Microcomputer responds to each operation of the key switch.

Memorizes programs, making program play possible.

⑤ Key switch display board.

Receives and displays the operation mode and transmits the signal to the system-control board.

(4) Compact disc player mechanism


STEPPING MOTOR
SPINDLE MOTOR
LOADING MOTOR
PICK-UP
CHUCK
TURN TABLE

Pickup	Transmits the laser beam to the disc surface; digital signals on the disc are read out by the reflected beam.
Spindle motor	Rotates the turntable.
Stepping motor	Rotated by pulses, it moves the pickup.
Loading motor	Rotated by the pressing of the OPEN/CLOSE key, it opens and closes the disc holder.
Turntable	Holds the disc.
Chuck	Secures the disc to the turntable.

8. REPLACEMENT OF PICKUP AND SPINDLE MOTOR

The compact disc player is a precisely constructed instrument. First of all, the angle of the laser beam emitted from the pickup must be at a 90° angle to the disc.
If an error occurs in this angle, an error in the angle of the laser beam reflected from the disc surface will also occur, so that the signal cannot be detected and none of the servos (spindle servo, focus servo and radial servo) can operate correctly.
Another important factor is that the spindle motor, which rotates the disc, must rotate smoothly and without eccentricity.
As can be seen then, replacement of the pickup or spindle motor and other parts must be done with great care in order to maintain the original precision, and it is absolutely necessary that adjustments be correctly made after the replacement.

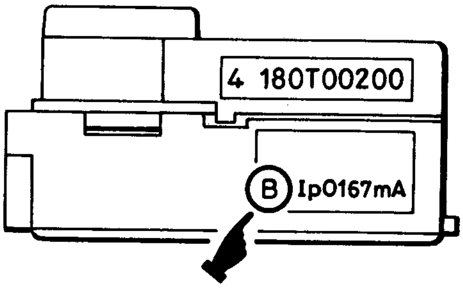
(1) Preparations

a. Prepare the measuring instruments and test discs which will be necessary to make adjustments.
(Before attempting to make any adjustments, carefully read the section "Compact Disc Player Adjustments" on page 18.)

b. After the adjustments are completed, be sure to apply a coating of adhesive or screw-lock paint to places where such was previously applied.

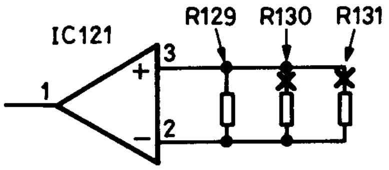
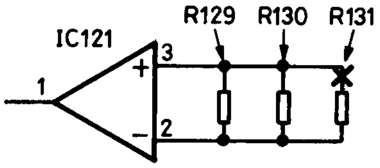
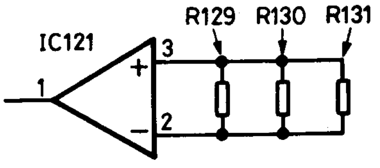
(2) Pickup replacement

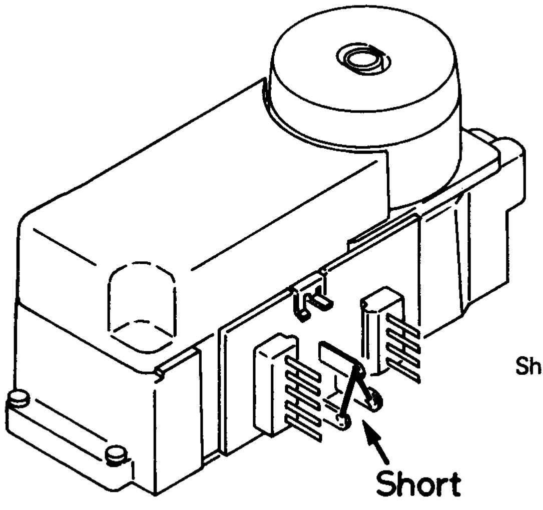
There are three ranks of pickup: A, B and C.
Be sure to replace the pickup with one of the same rank.
If the pickup is for any reason replaced by one of another rank, the following procedure will be necessary.



Pickup rank indication

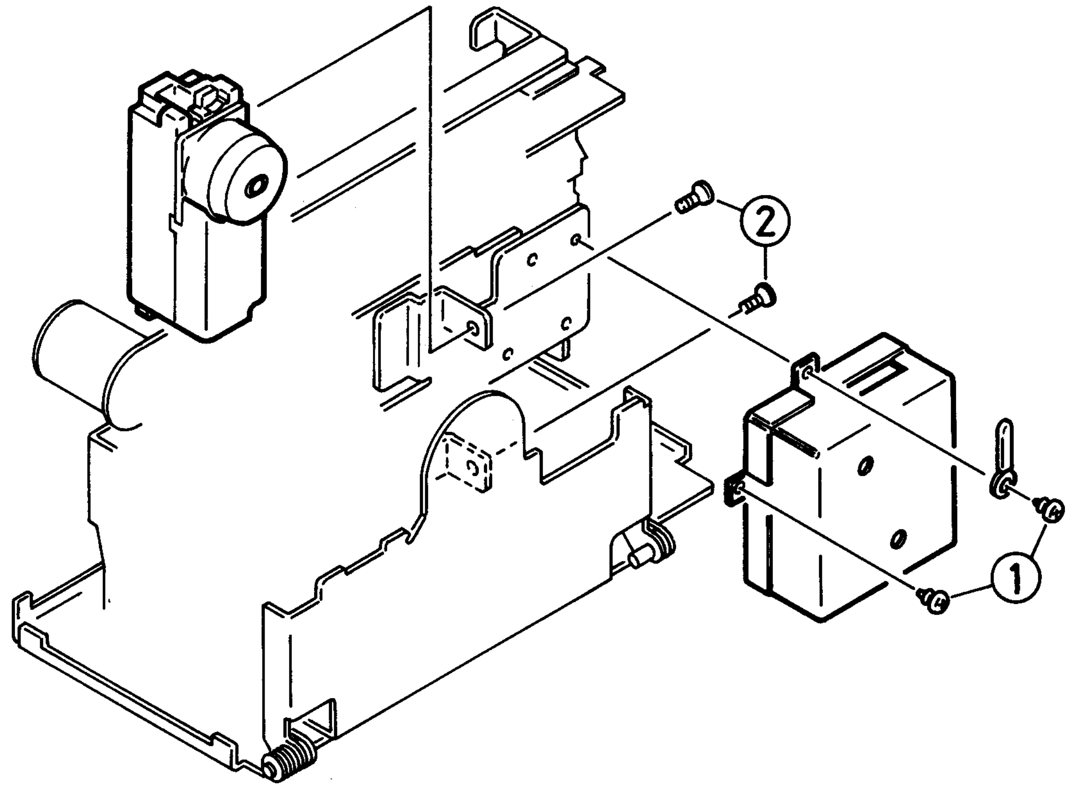
Change the resistance of the sensor preamp/laser power board in accordance with the pickup rank, as indicated below.

A RANK	B RANK	C RANK
		
Cut the legs of the R130 and R131 resistors.	Connect the legs of the R130 resistor. Cut the legs of the R131 resistor.	Connect the legs of the R130 and R131 resistors.



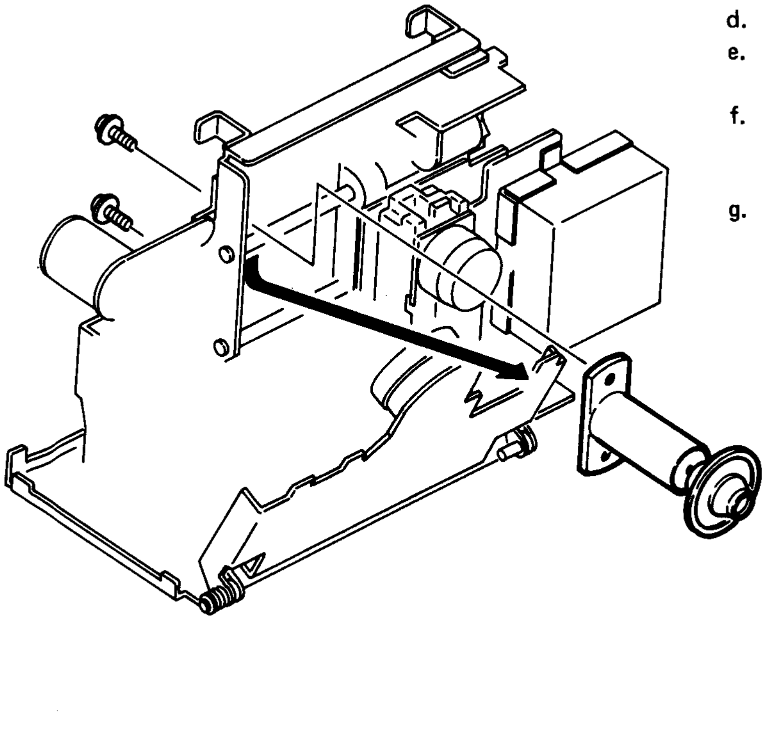
When replacing the pickup, first short circuit the laser diode terminals by using a lead wire, and then solder.
If there is no malfunction of the pickup, damage caused by static electricity can be prevented.

Short the terminals on the laser diode.

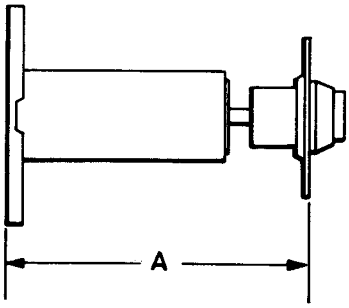


(3) Spindle motor replacement

a. Remove the spindle motor from the mechanism.
b. Measure and make a note of the dimension indicated as A in the figure. (This will be A1.)

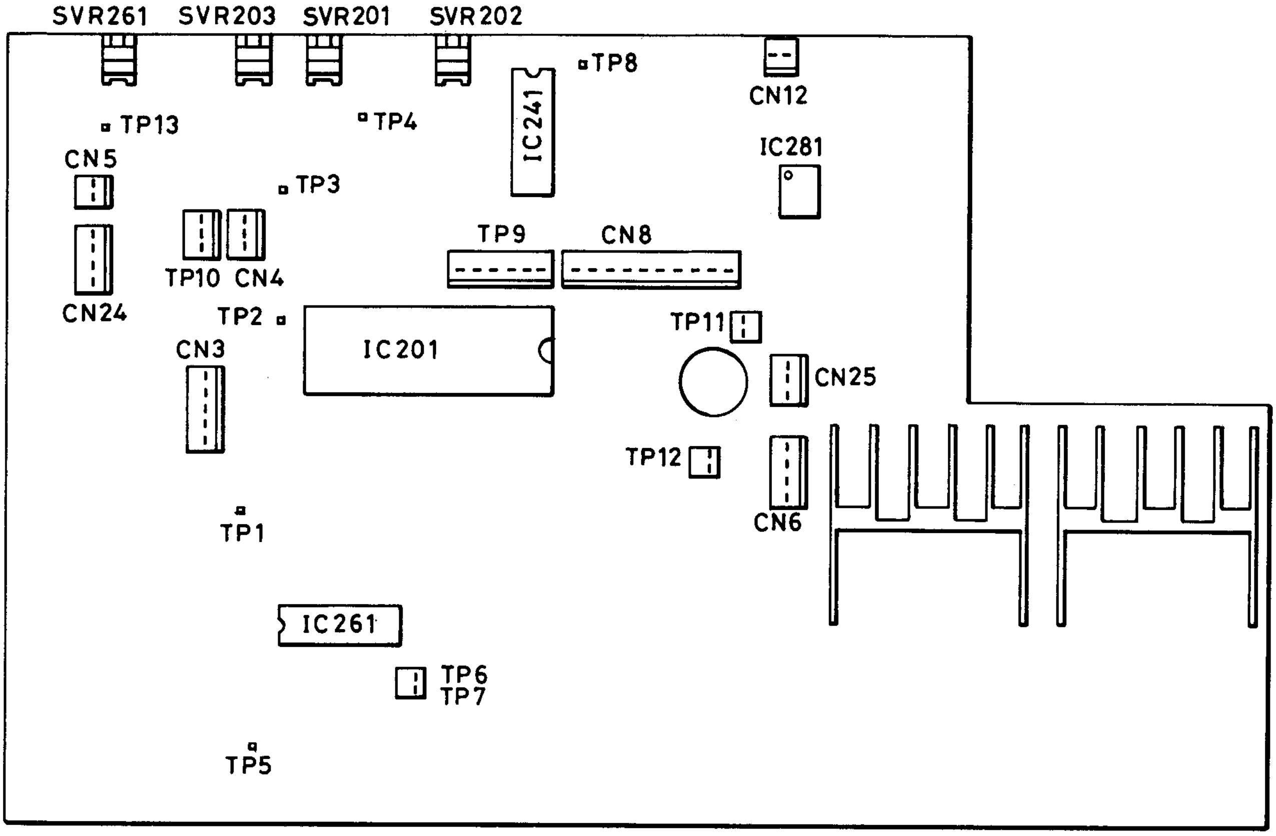


c. Completely turn the height adjustment screw at the rear of the spindle motor clockwise.
Then measure and make a note of the dimension indicated as A in the figure under this condition. (This will be A2.)
d. Remove the old spindle motor from the turntable.
e. Completely turn the height adjustment screw at the rear of the new spindle motor clockwise.
f. Attach the new spindle motor to the turntable.
Then make an adjustment so that dimension A is the same as A2 measured in step (c.).
g. Turn the height adjustment screw at the rear of the new spindle motor so that its dimension is the same as A1 measured in step (b.).

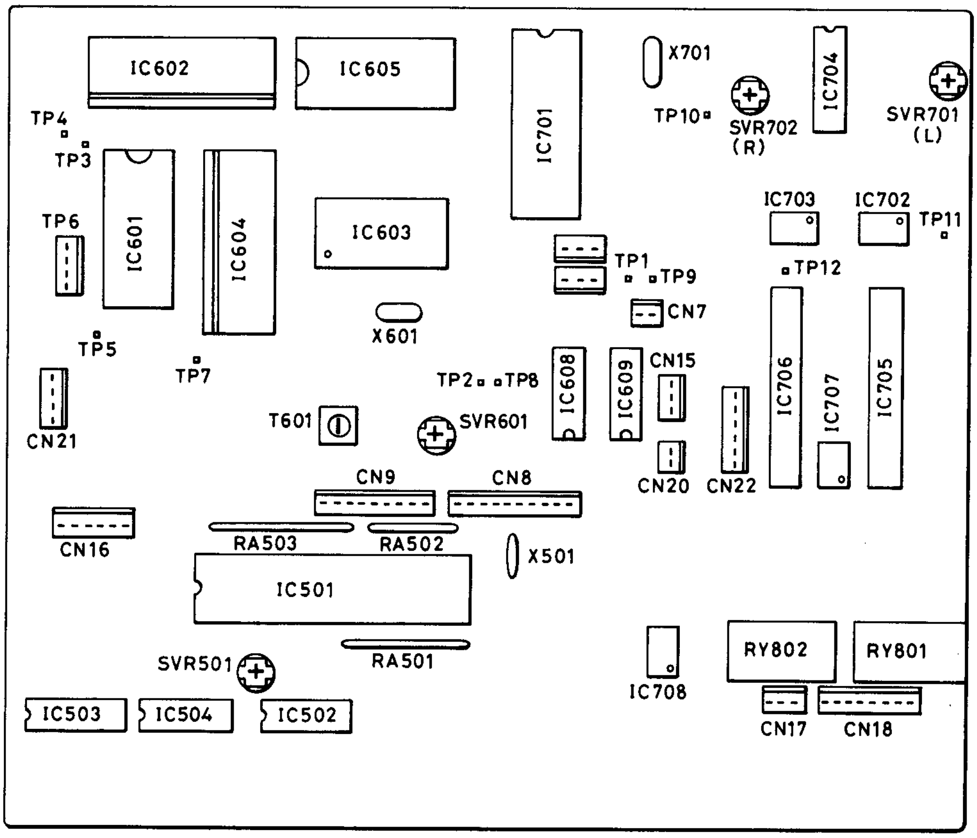


Referenc value (61.0±0.5 mm)

9. PARTS LOCATION


SVR261
SVR203
SVR201
SVR202
TP8
CN12
TP13
TP4
IC241
CN5
TP3
IC281
TP9
CN8
TP10
CN4
CN24
TP2
IC201
TP11
CN3
CN25
TP12
CN6
TP1
IC261
TP6
TP7
TP5

Servo & Equalizer P.C.B


IC602
IC605
IC701
X701
IC704
TP4
TP3
TP10
SVR702
(R)
SVR701
(L)
TP6
IC601
IC604
IC603
IC703
IC702
TP11
TP1
TP9
TP12
CN7
X601
TP5
TP7
TP2
TP8
IC608
IC609
CN15
IC706
IC707
IC705
T601
SVR601
CN21
CN9
CN8
CN20
CN22
CN16
RA503
RA502
X501
IC501
RA501
SVR501
IC708
RY802
RY801
IC503
IC504
IC502
CN17
CN18

Digital Audio P.C.B

10. COMPACT DISC PLAYER ADJUSTMENTS

Up to this point, we have explained the handling of the compact disc player, precautions before servicing, handling of the pickup, how to disassemble the unit, an outline of the system, etc. Be sure to read those sections carefully before attempting to make any adjustments. The following sections are explanations of procedures to be followed for making adjustments of the compact disc player.

Step	Adjustment
1.	Adjustment of laser power.
2.	Adjustment of skew.
3.	Adjustment of turntable height.
4.	Adjustment of preamplifier gain.
5.	Adjustment of EFM (comparator level).
6.	Adjustment of PLL.
7.	Adjustment of radial gain.
8.	Adjustment of focus offset.
9.	Adjustment of focus gain.
10.	Checking RE (radial error) voltage and following voltage
11.	Adjustment of pause.
12.	Adjustment of audio offset.
13.	Checking adjustments and minor adjustments.

A. **If pickup is replaced**

a. All adjustments must be made in the order shown above.

b. The adjustment of the laser power in step 1. must be made very carefully, and, because the adjustment of skew in step 2. is the basis of subsequent adjustments, it must be made with extreme care.

B. **If the pickup is not replaced**

a. if operation is not normal. make readjustments of steps 3. to 13.

b. When any adjustment is made, all subsequent items in the listed order must be readjusted.
(If, for example, the PLL adjustment in step 6 is made, items 7 ~ 13 must be readjusted.)

c. When the pickup is not replaced, it is generally not necessary to make the skew adjustment. If, however, the eye pattern of the HF signal is not open, the skew adjustment should be made.
(Eye pattern: page 22, b of Fig. C.)

C. **Other**

a. Although the connection jig described in the specifications in not absolutely necessary in order to make the adjustment, its use is recommended in order to make the adjustment easier.

b. Refer to page 30 for information concerning checking of the adjustments and minor adjustments.

c. Use a probe when using an oscilloscope, memory scope or digital voltmeter to view the signal. For grounding at that time, use the probe ground at the ground point closest to the signal.

INSTRUMENTS REQUIRED FOR ADJUSTMENTS

Item	Model and manufacturer	
Laser power meter	ML96A (MA911A sensor, processed item)	(ANRITSU)
Memory scope	DSS6521 (storage scope)	(KIKUSUI)
Oscilloscope	SS5711 (100 MHz)	(IWATSU)
AC digital voltmeter	Multch Meter	
DC digital voltmeter	Multch Meter	
DC power supply	(0 ~ +5V, 1A)	

Note: Adjustments are possible by using equipment from other manufactures if their performance corresponds to that shown above.

TEST DISCS REQUIRED FOR ADJUSTMENTS

No.	Item	Description and manufacture		
No. 1	800 104–2	DEMO. DISC		(Poly Gram)
No. 2	YEDS 3	TEST CD. TYPE 2		(SONY)
No. 3	Eccentricity disc	Eccentricity width	: 200μm	
No. 4	Surface oscillation disc	Oscillation width	: +400μm	
No. 5	Scratch disc	Black spot width (Black spot disc)	: 300μm	
No. 6	YEDS 2	TEST C.D. TYPE 1		(SONY)

Note: These discs may be changed without prior notice.

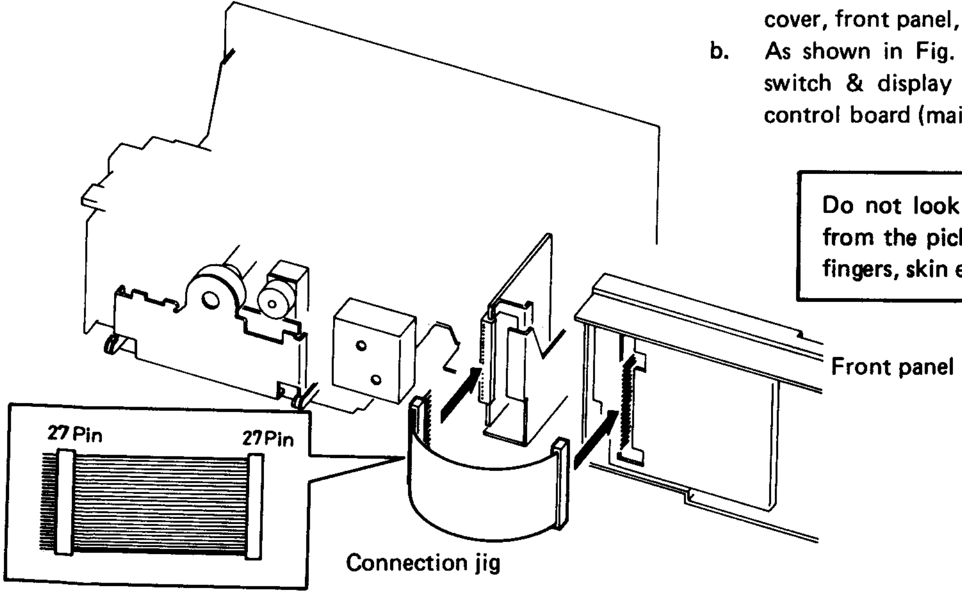


Fig - A

(1) Adjustment of laser power

a. As shown in Fig. A, remove the cabinet, bottom lid, disc cover, front panel, and reinforcement.

b. As shown in Fig. A, connect the connector of the key switch & display board (front panel) and the system-control board (main unit) by the connection jig (AJ-001).

Do not look directly at the laser beam coming from the pickup or allow it to strike against your fingers, skin etc.

c. As shown in Fig. B, semi-fixed resistor SVR121 for laser power adjustment should be turned ahead of time completely counterclockwise (Note 1).

d. Switch on the power. (The pickup will move to the lead-in position.)

e. As shown in Fig. C, the gear part of the stepping motor is to be freed and moved to a position at which the pickup can be easily measured.

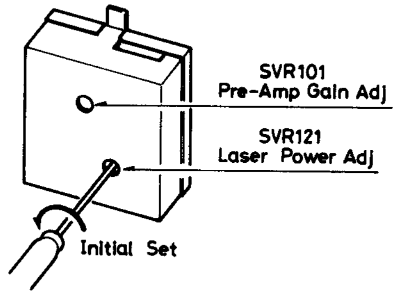

SVR101
Pre-Amp Gain Adj
SVR121
Laser Power Adj
Initial Set

Fig-B

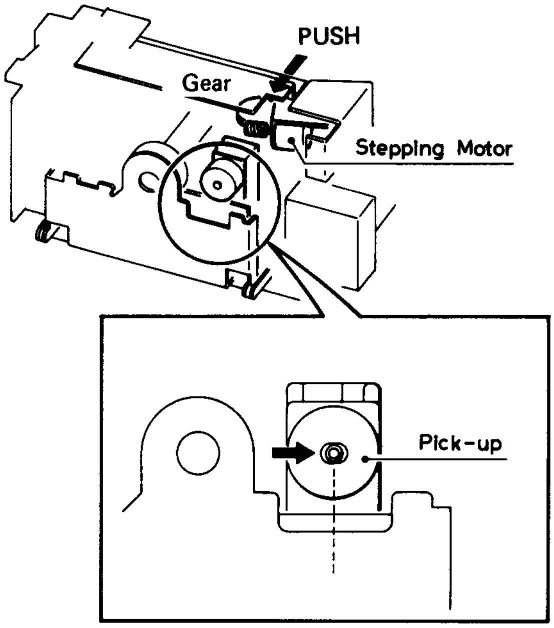

PUSH
Gear
Stepping Motor
Pick-up

Fig-C

f. As shown in Fig. D, use a flat-tip screwdriver to interrupt the disc sensor beam, thus causing detection.

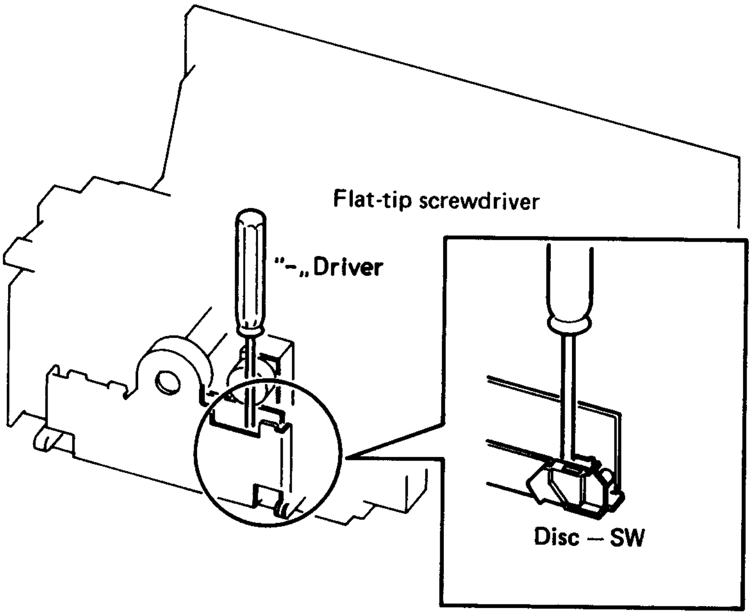

Flat-tip screwdriver
"-„ Driver
Disc – SW

Fig-D

Laser Power Meter Zero Adjust

Press the play switch only after the laser power meter sensor has been perfectly aligned with the laser output section of the pickup.

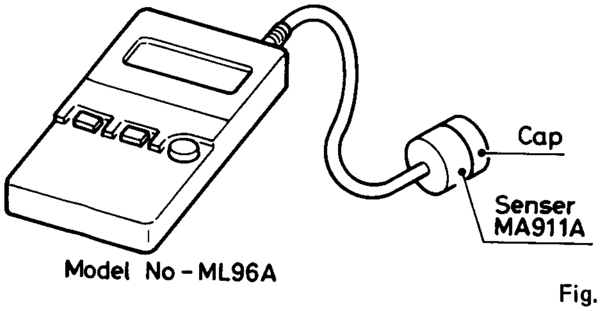


Fig. –E

OPTICAL POWER METER

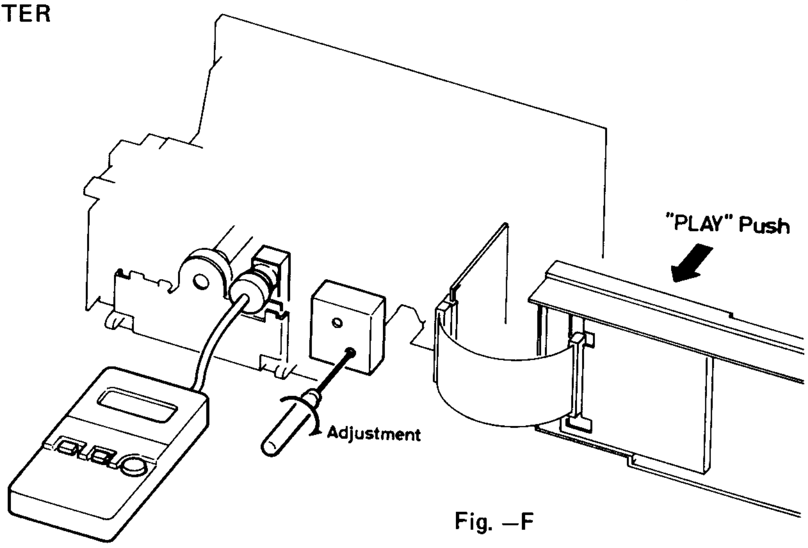


Fig. –F

g. As shown in Fig. E, make the zero-point adjustment of the laser power meter sensor, with the cap not removed. (Adjust by turning the zero-set control so that 0.000 mW is indicated.)

h. As shown in Fig. F, remove the cap of the laser power meter, and align the sensor opening and the laser part of the pickup.

i. As shown in Fig. F, press the PLAY switch. The spindle motor will then begin rotating, and the laser part of the pickup will also move.

j. At this time (while the spindle motor and the laser part of the pickup are operating), make the adjustment by slowly and a little at a time turning clockwise SVR121 so that the value shown by the laser power meter becomes 0.286 mW. (Laser beam projection will begin.)

Notes:

1. The semi-conductor laser may be damaged if SVR121 is turned in the reverse (clockwise) direction from its original setting or if it is turned by too great an amount at one time. More than 0.35 mW should not be used, even though it might be possible.
2. Do not touch the laser part of the pickup or allow it to come near the eyes, because doing so might damage the pickup or injure the eyes.
3. There are 3 rank classifications of the pickup: A, B and C. Be sure to check to confirm that the connections of R130 and R131 of the preamplifier & laser power board are correctly made according to the rank of the pickup being used. (See page 15.)
4. For the sensor of the laser power meter, one with an expanded detection port should be used. If one that does not have an expanded port is used, it might strike the pickup lens and damage the pickup.
5. When making the adjustments in item (i.) and item (j)., the operation of the spindle motor and the pickup laser part will stop after a few seconds. Each time they stop while the adjustments are being made, press the PLAY switch and then make the adjustment.
6. Use ML96A as the laser power meter. If any other meter is used, a compensation adjustment should be made. (With ML96A, 0.3 mW of power is output when the indication is 0.286 mW.)

(2) Adjustment of skew

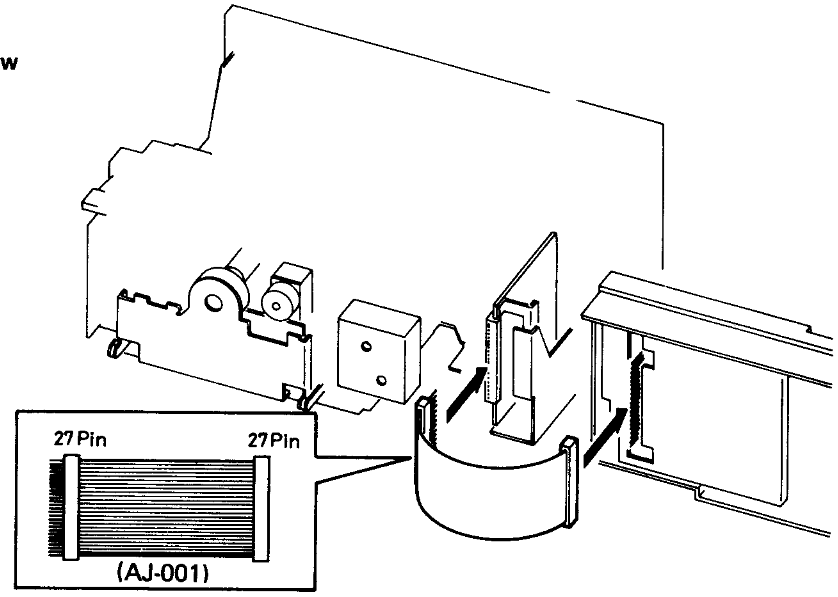

27Pin
27Pin
(AJ-001)

Fig - A

a. As shown in Fig. A, remove the cabinet, bottom lid, disc cover and front panel.
b. As shown in Fig. A, connect the connector of the key switch & display board (front panel) and the system-control board (main unit) by the connection Fig. (AJ-00)
c. As for the focus offset voltage (TP3), before making the adjustment of the skew, adjust SVR201 so that the DC voltage becomes the same for play and for stop.
d. As shown in Fig. B, connect an oscilloscope to TP1 (HF signal) and TP2 (DL signal) of the servo & equalizer board.
e. Switch the power on and set test disc No. 1.
f. As shown in Fig. B, press the PLAY switch and then check to be sure that the HF signal (part "a") is linear and that the eye pattern (part "b") is expanded. (See Fig. C.)
g. If the conditions in step (f.) are not satisfied, adjust tilt-holding screw I (tangential skew) of the pickup plate, as shown in Fig. D, so that the conditions in step (f.) are satisfied.
h. If the adjustment described in step (g.) cannot be made, adjust tilt-holding screw II (radial skew) of the pickup plate, as shown in Fig. D, so that the HF signal amplitude is maximized and the DL signal amplitude is minimized.
i. Repeat the adjustments in steps (g.) and (h.) so that the waveform is as shown in Fig. C.

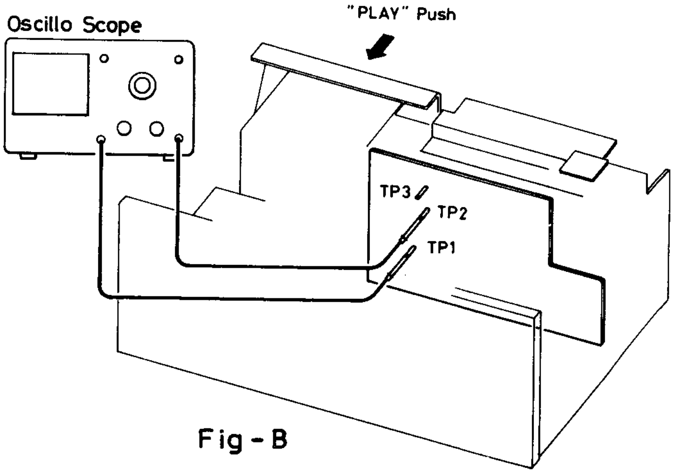

Oscillo Scope
"PLAY" Push
TP3
TP2
TP1

Fig - B

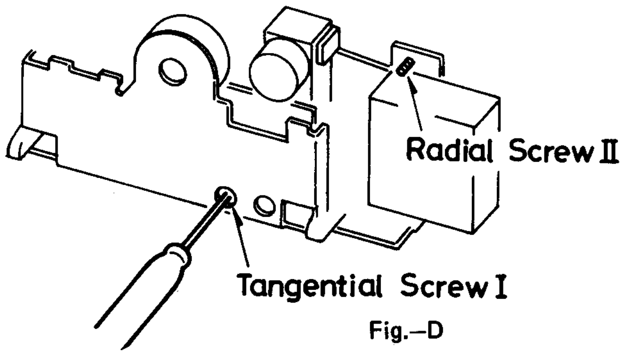

Radial Screw II
Tangential Screw I

Fig.–D

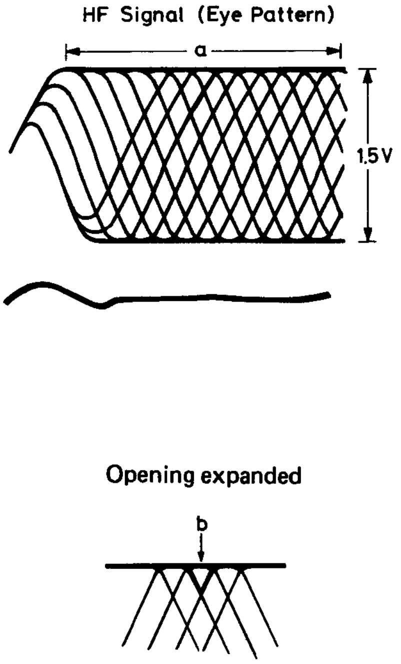
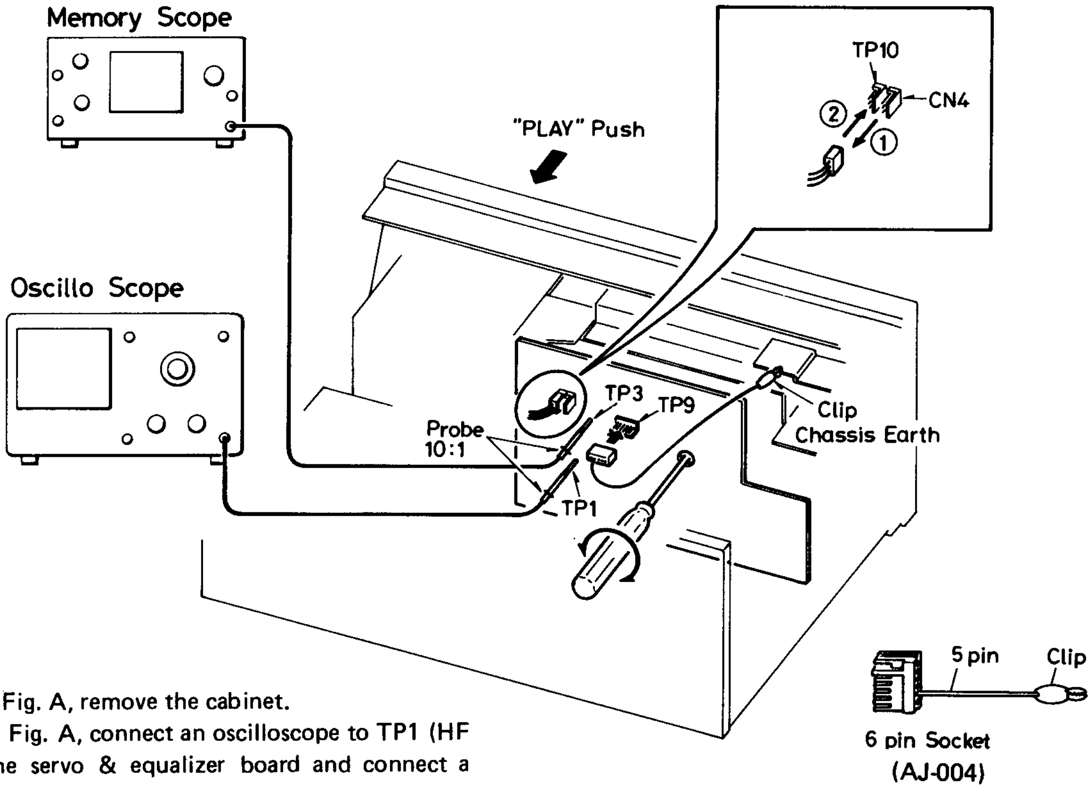
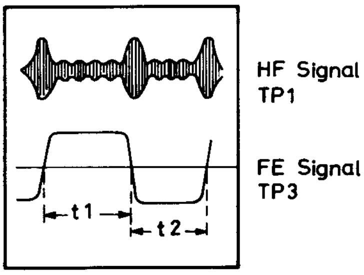

HF Signal (Eye Pattern)
a
1.5V
Opening expanded
b

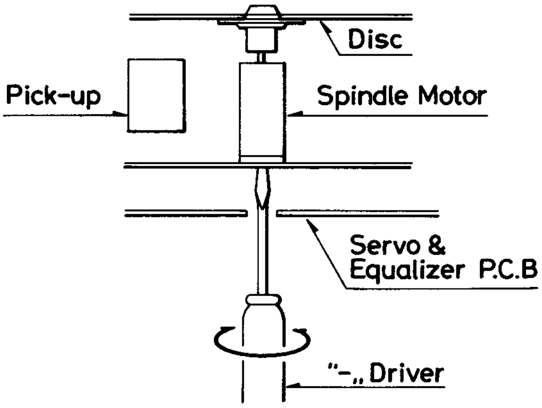
Fig.–C

(3) Adjustment of turntable height



a. As shown in Fig. A, remove the cabinet.
b. As shown in Fig. A, connect an oscilloscope to TP1 (HF signal) of the servo & equalizer board and connect a memoryscope to TP3 (FE signal).
c. As shown in Fig. A, reconnect connector CN4 (3-pin) to the adjacent TP10. (HF.OK (IC201 – 20-pin) forced high) Then set the connection jig (AJ-004) to TP9. The clip from the connection jig (AJ-004) should be connected to the metal part (chassis ground) of the mechanism. (N.HOP/READY (IC201 – 5-pin) forced low)





Flat–tip Screwdriver

d. Switch the power on and prepare test disc No. 2 for play.
e. As shown in Fig. A, press the PLAY switch and, with the HF signal waveform on the oscilloscope screen, adjust the spindle motor shaft, by adjusting the screw on the back of the motor, so that FE signal waveforms t1 and t2 on the memoryscope become the same time (50%duty).
f. Press the OPEN/CLOSE switch and take out the disc. Then insert it once again and press the OPEN/CLOSE switch. (Disc chucking) Then press the PLAY key again, and check to be sure that FE signal waveforms t1 and t2 are the same. Repeat this chucking check 2 or 3 times.

Notes:

1. If a memoryscope is not available, an oscilloscope can be used as a substitute but the adjustment will be slightly more difficult.
2. Because rough pitch may result in backlash when the spindle motor shaft adjustment screw is adjusted, the adjustment should be checked after the screwdriver is taken out of the screw.
3. If the signal waveform does not appear, turn the adjustment screw all the way in one direction or the other, and then turn it little by little in the reverse direction and adjust it to the position where the FE signal waveform on the oscilloscope reverts from high to low or low to high.
4. Because the spindle motor will stop every few seconds, press the PLAY switch each time it stops and continue with the adjustment.
5. After the adjustment has been completed, remove the connection jig, and return the TP10 connector to CN4.

(4) Adjustment of preamplifier gain

a. As shown in Fig. A, remove the cabinet, disc cover and front panel.

b. As shown in Fig. A, connect the connector of the system-control board and the key switch & display board on the front panel by using the connection jig (AJ-001).

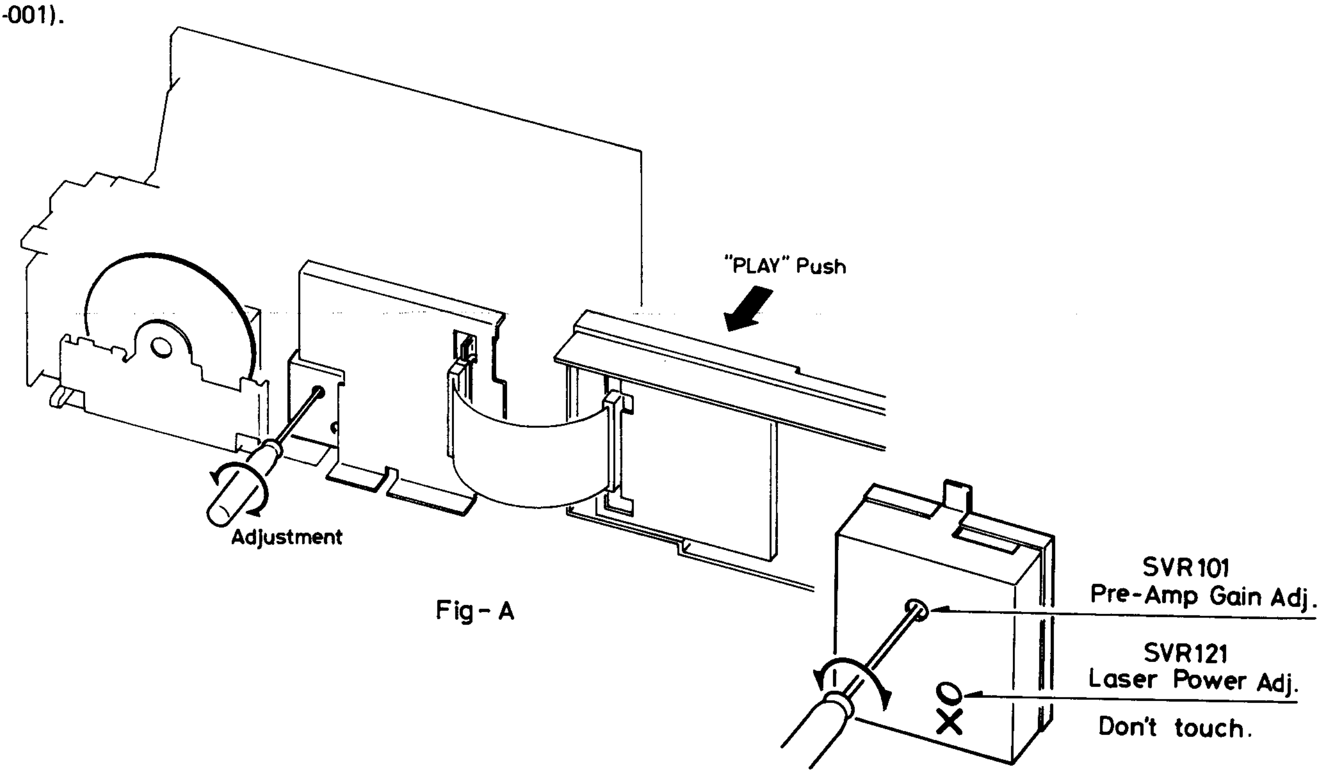

"PLAY" Push
Adjustment
SVR101
Pre-Amp Gain Adj.
SVR121
Laser Power Adj.
Don't touch.

Fig - A

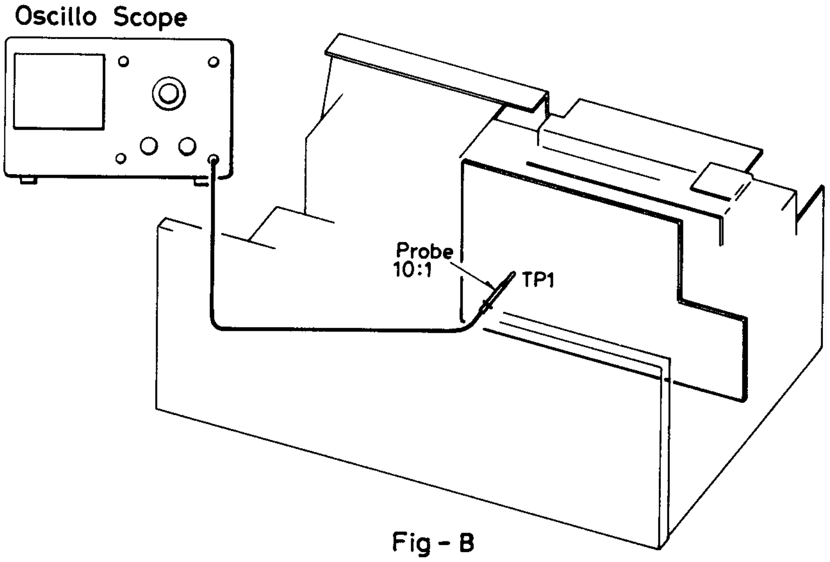

Oscillo Scope
Probe
10:1
TP1

Fig - B

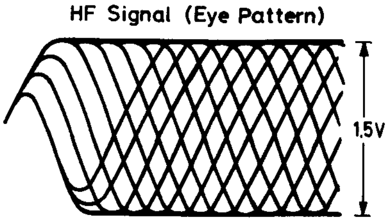

HF Signal (Eye Pattern)
1.5V

Fig - C

c. As shown in Fig. B, connect an oscilloscope to TP1 (HF signal) of the servo & equalizer board.

d. Switch the power on and prepare test disc No. 1 for play.

e. As shown in Fig. A, press the PLAY switch, and then adjust SVR101 so that the HF signal waveform (see Fig. C) on the oscilloscope screen becomes 1.5 V^{P-P}.

Notes:

1. Do not turn SVR121 (for adjustment of laser power), which is on the same board. If it is accidentally turned, the pickup may be damaged as a result. Check very carefully which SVR is being turned before making this adjustment.
2. Check whether or not connector CN4 is connected to TP10 before making the adjustment.

(5) Adjustment of EFM (comparator level)

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, connect an oscilloscope to TP1 (HF signal) of the servo & equalizer board.

c. Switch the power on, and prepare test disc No. 2 for play.

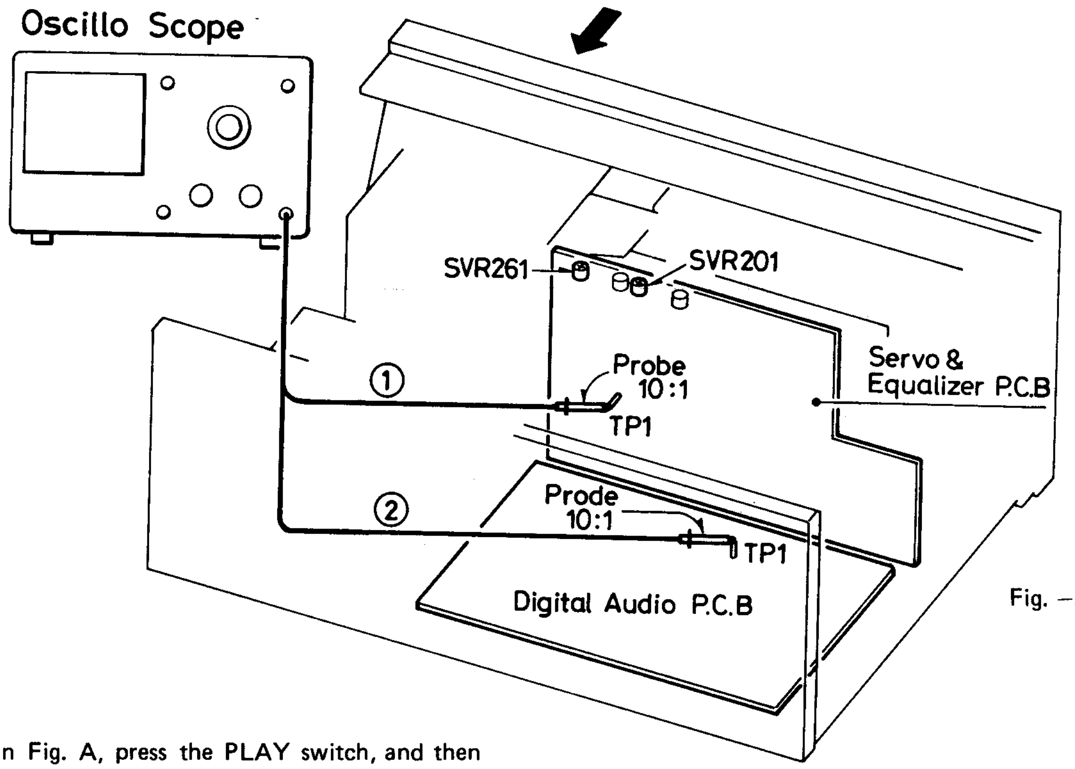

"PLAY" Push
Oscillo Scope
SVR261
SVR201
Servo &
Equalizer P.C.B
①
Probe
10:1
TP1
②
Prode
10:1
TP1
Digital Audio P.C.B

Fig. –A

d. As shown in Fig. A, press the PLAY switch, and then adjust SVR201 so that the eye pattern waveform on the oscilloscope screen becomes stabilized. (Refer to the waveform in Fig. B.)

e. As shown in Fig. A, connect an oscilloscope to TP1 (EFM signal) of the digital audio board.

f. As shown in Fig. C, adjust SVR261 to get 1 V at the point of intersection of the first 6T downslope and the first 3T upslope.

Note:

- Take care not to confuse 6T with 7T or 5T. If an error is made, the waveform will deviate in the direction of the horizontal axis.

HF Signal (Eye Pattern)

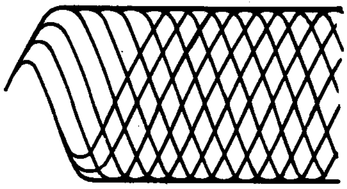
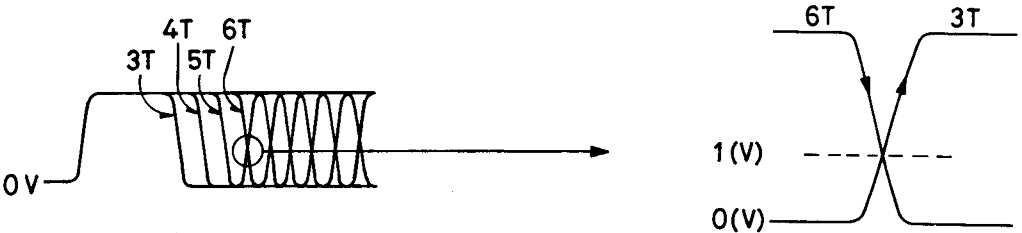


Fig. –B


4T
6T
3T
5T
0 V
6T
3T
1 (V)
0(V)

EFM Signal

3T·6T Cross Point

Fig. –C

(6) Adjustment of PLL (Phase Locked Loop)

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, connect an oscilloscope to TP2 of the digital & audio board.

c. Switch the power on, and prepare test disc No. 2 for play.

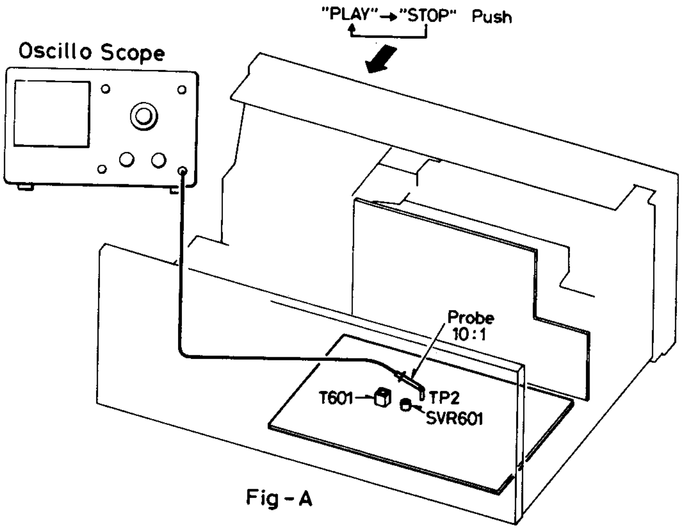


Fig - A

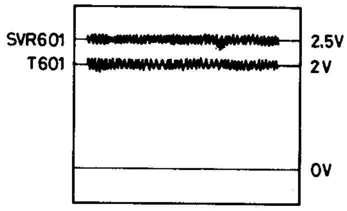


Fig - B

d. As shown in Fig. A, press the PLAY switch, and then adjust T601 (L603) so as to get 2.0 V at the center of the oscilloscope waveform when the music starts. (Refer to the waveform in Fig. B.)

e. Next, press the STOP switch and adjust SVR601. Then press the PLAY → STOP switch. Repeat operation of the PLAY → STOP switch until the voltage is adjusted to 2.5 V. (Refer to the waveform in Fig. B.)
(No change of the voltage will appear if SVR601 is turned during the stop mode. The voltage originally set will appear when the unit is set for play and then once again stopped.)

f. Once again check and adjust as in steps (d) and (e).

Note:

- If the adjustment cannot be made, turn SVR601 completely in the clockwise direction (T601 core slightly protruding from the case), and make the adjustment once again.

(7) Adjustment of radial gain

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, connect a memoryscope to TP4 of the servo & equalizer board.

c. Switch the power on and prepare eccentricity test disc No. 3 (eccentricity width 200 μm) for play.

d. As shown in Fig. A, press the PLAY switch, and then adjust SVR202 so that the memoryscope signal waveform becomes 350 mV^{P-P}. (Refer to the waveform in Fig. B.)

Note:

- The eccentricity disc has a slightly enlarged center hole. Set it so that it is slightly out of position during chucking.

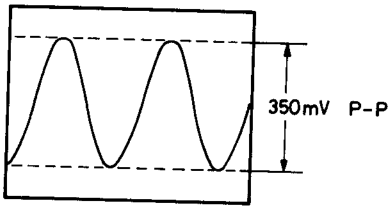


Fig - B

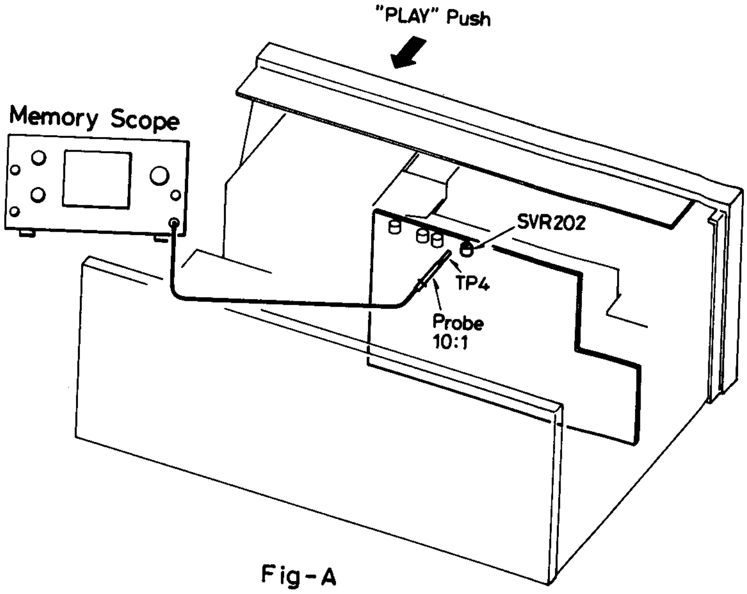


Fig - A

(8) Adjustment of focus offset

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, connect a DC digital voltmeter to TP3 of the servo & equalizer board.

c. Switch the power on, and prepare test disc No. 1 for play.

d. As shown in Fig. A, press the PLAY switch, and then press the STOP switch while the music is playing. Measure the voltage during the stop mode and make a note of the measured voltage.

e. Next, press the PLAY switch, so that the unit is in the play mode, and then adjust SVR201 to obtain a voltage 30 to 40 mV higher than the voltage noted in step (d.)

Notes:

1. Do not use a test disc which has surface oscillation.
2. Make the adjustment of 30 to 40 mV in step (e.) so that the eye pattern is not mis-shaped too much.

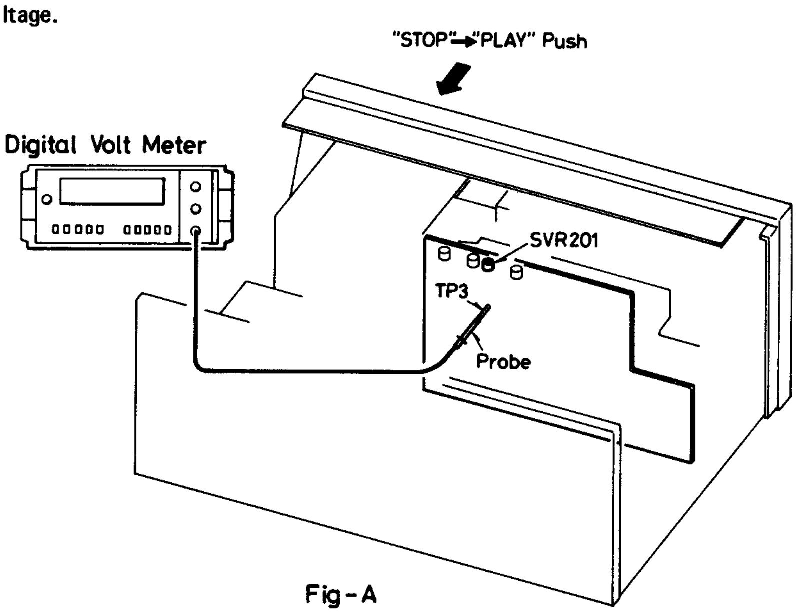


Fig-A

(9) Adjustment of focus gain

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, connect a memoryscope to TP3 (FE signal) of the servo & equalizer board.

c. Switch the power on, and prepare surface oscillation test disc No. 4 (surface oscillation width +400 μm) for play.

d. Play the music in the outermost track of the disc.

e. As shown in Fig. A, adjust SVR203 so that the memory-scope signal waveform becomes 100 mV$^{P\text{-}P}$. (Refer to Fig. B.)

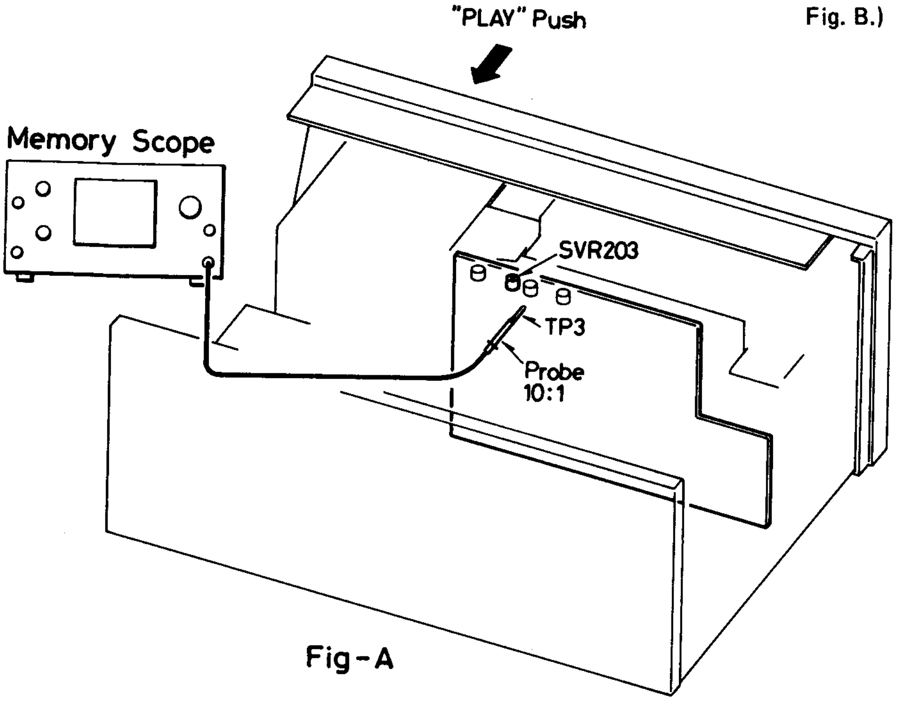


Fig-A

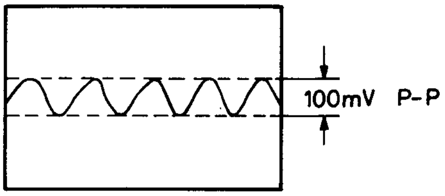


Fig-B

(10) Checking RE (radial error) voltage and following voltage

a. As shown in Fig. A, remove the cabinet, bottom lid and disc cover.

b. As shown in Fig. A, Connect an AC digital voltmeter to TP4 of the servo & equalizer board.

c. Switch the power on, and prepare test disc No. 2 for play.

d. As shown in Fig. A, press the PLAY switch, and, with the music playing, connect a connection jig (AJ-005) to TP9 of the servo & equalizer board. Attach the clip from the connection jig (AJ-005) to the metal part of the mechanism (chassis ground). Then check to be sure that the voltage shown on the AC volt meter is 300 mV or more. ($\overline{FS}$/OPEN (IC201 – 4-pin) low).

e. Next, as shown in Fig. A, disconnect the connection jig (AJ-005) connected in step(d.), and then connect a DC digital voltmeter to TP8 of the servo & equalizer board.

f. While the music is playing, free the gear part of the stepping motor, and check to be sure that the DC volt meter voltage reading is 7 V or more.

Notes:

1. The expression "while the music is playing" in steps(d.) and (f.) does not refer to parts between turns; it is while music is only actually playing.
2. If the reading is less than specified, repeat the adjustments in steps (3) through (9). If, however, the HF signal waveform is not clean, begin from step (2).

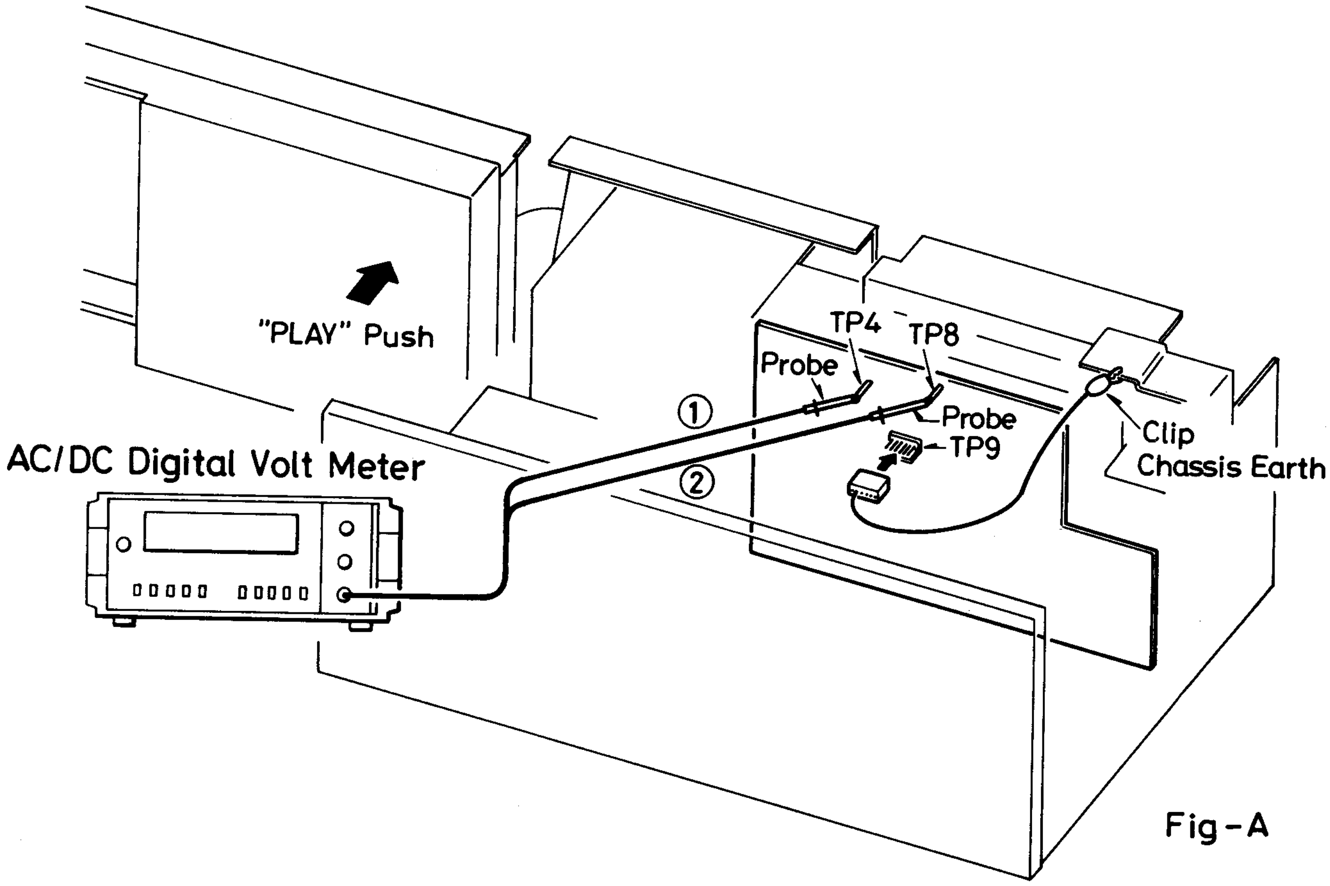
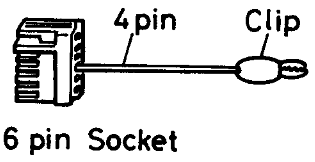


Fig-A



(AJ-005)

(11) Adjustment of pause

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, set the oscilloscope to pattern 3, and connect it to TP9 (IC201 – 5-pin (N.HOP), 3-pin (P.HOP), 1-pin (Z-DET)) of the servo & equalizer board.

c. Switch the power on, and prepare test disc No. 2 for play.

d. Press the PAUSE switch, use the FWD ACCESS switch to indicate the second tune, and then, when the real-time counter in dicates a bar (——) indication (between tunes), make the adjustment.

e. As shown in Fig. A, adjust SVR501 of the digital & audio board so that the width of the signal waveform (N.HOP) on the oscilloscope screen becomes 200 μsec. (Refer to Fig. B.)

f. At this time, check to be sure that there is no track-jump waveform (large peak shape) during the time T of the signal waveform (Z-DET) on the oscilloscope. (Refer to Fig. B.)

Notes:

1. The pause mode mentioned in step (d.) will automatically change to the stop mode after 5 minutes have passed.
2. If the track-jump waveform mentioned in step (f.) does appear, repeat adjustments (3) through (9). If, however, the HF signal waveform is not clean, begin from step (2).
3. For a pattern 2 oscilloscope, input P.HOP to channel A and apply the trigger, and observe N.HOP or Z.DET on channel B.
4. Switch the input mode of the oscilloscope to the CHOP. SWEEP mode, and adjust the NORM.LEVEL control, so that the waveform is in the (–) SLOPE position. (The trigger LED should illuminate.)

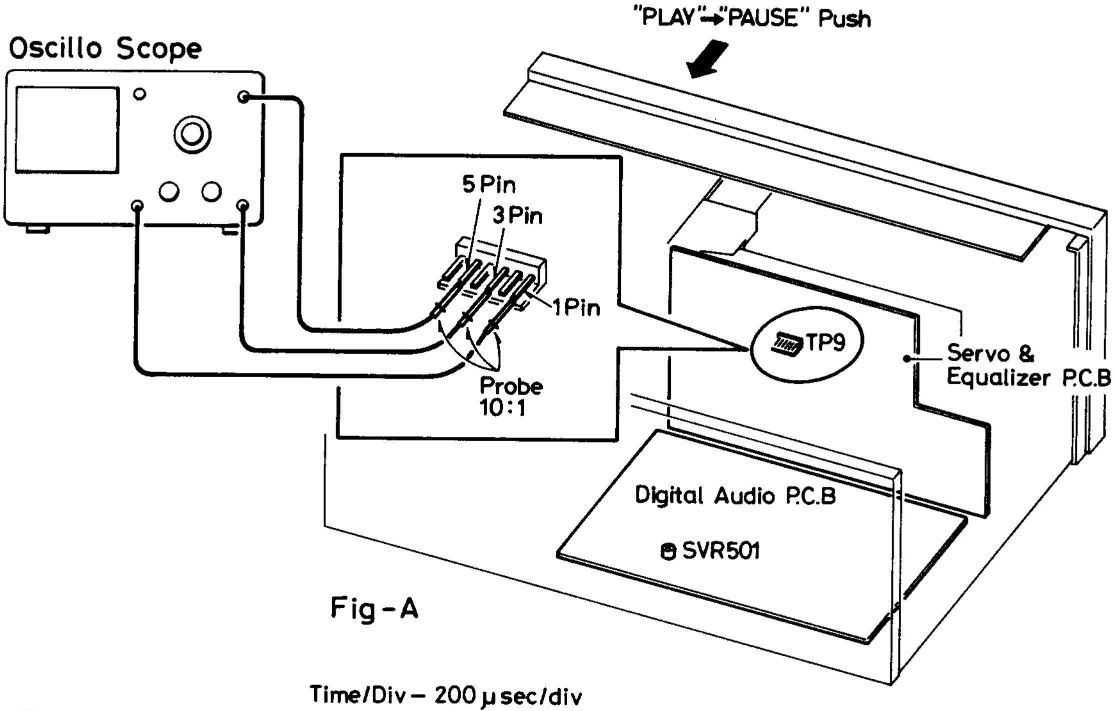

"PLAY"→"PAUSE" Push
Oscillo Scope
5 Pin
3 Pin
1 Pin
Probe 10:1
TP9
Servo & Equalizer P.C.B
Digital Audio P.C.B
SVR501

Fig-A

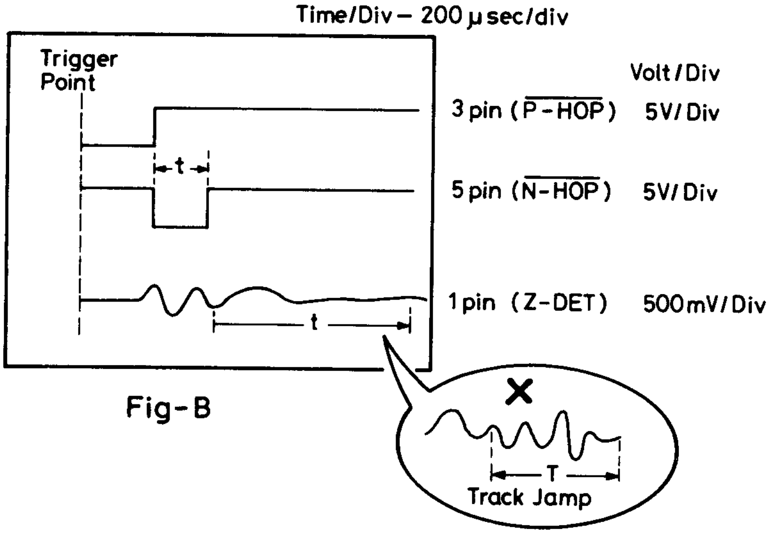

Time/Div – 200 μ sec/div
Trigger Point
t
t
Volt/Div
3 pin (P-HOP) 5V/Div
5 pin (N-HOP) 5V/Div
1 pin (Z-DET) 500mV/Div
X
T
Track Jamp

Fig-B

(12) Adjustment of audio offset

a. As shown in Fig. A, remove the cabinet.

b. As shown in Fig. A, connect a DC digital voltmeter to TP11 (L ch.) or TP12 (R ch.) of the digital & audio board.

c. Switch the power on, and then adjust SVR701 (L ch.) or SVR702 (R ch.) to get a 0.000 V reading on the DC digital voltmeter.

Notes:

1. The adjustment can be considered correct if, after adjustment, a voltage check shows ±0.02 V or less.
2. Adjust both channels (L and R).

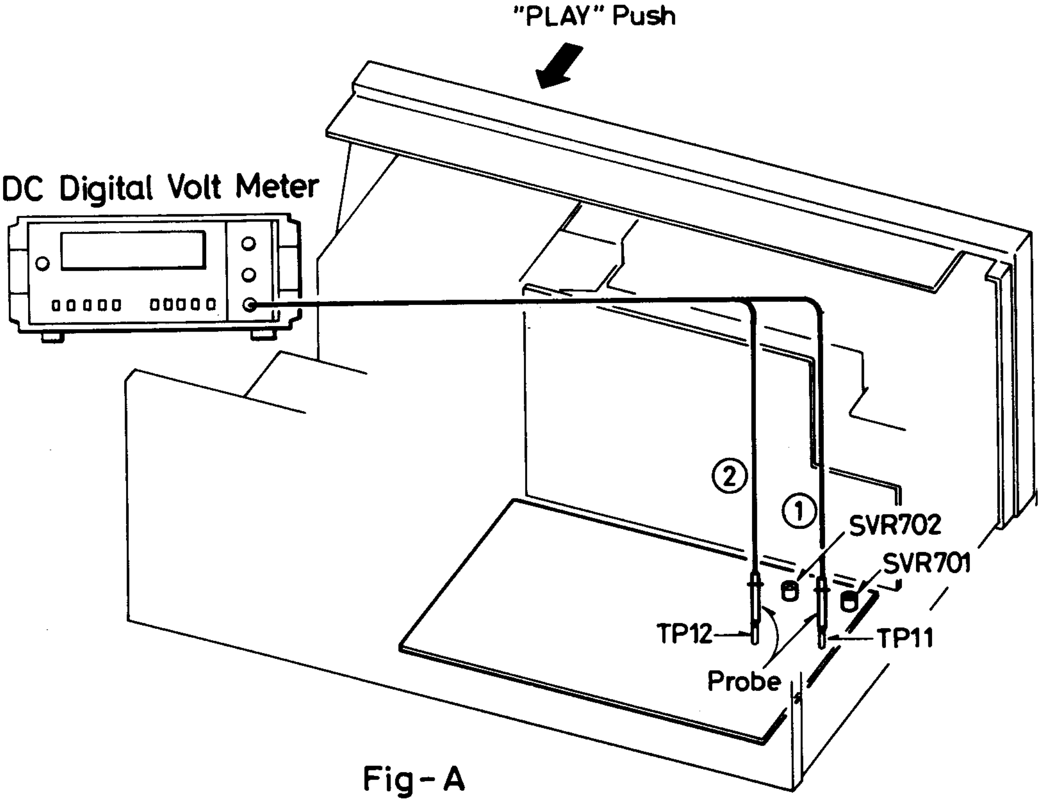


Fig-A

(13) Checking adjustments and minor adjustments

a. EFM adjustment

- First 6T downslope and second 3T upslope should intersect at 1 V.
- Observe the signal waveform of TP6 (IC604 – 11-pin (C1F1)), and adjust so that the error rate (error-stop signal) is minimized.

b. Focus offset adjustment

- Measured voltage during the stop mode and play mode should be as follows:

  Play mode voltage = stop mode voltage +30 ~ 40mV

c. PLL adjustment

- Measured voltage during the stop mode and play mode should be as follows:

  Play mode voltage = 2.0 V
  Stop mode voltage = 2.5 V

d. Test disc check

- Black spot disc ... test disc No. 5 (with 300 μm black scratch)

  There should be no track jump during play.
- Surface oscillation disc ... test disc No. 4 (surface oscillation width +400μm)

  There should be no track jump during play of the lead-in of the 1st, 4th and 12th tunes.
- Eccentricity disc ... test disc No. 3 (eccentricity width 200 μm)

  There should be no track jumping (especially during lead-in).

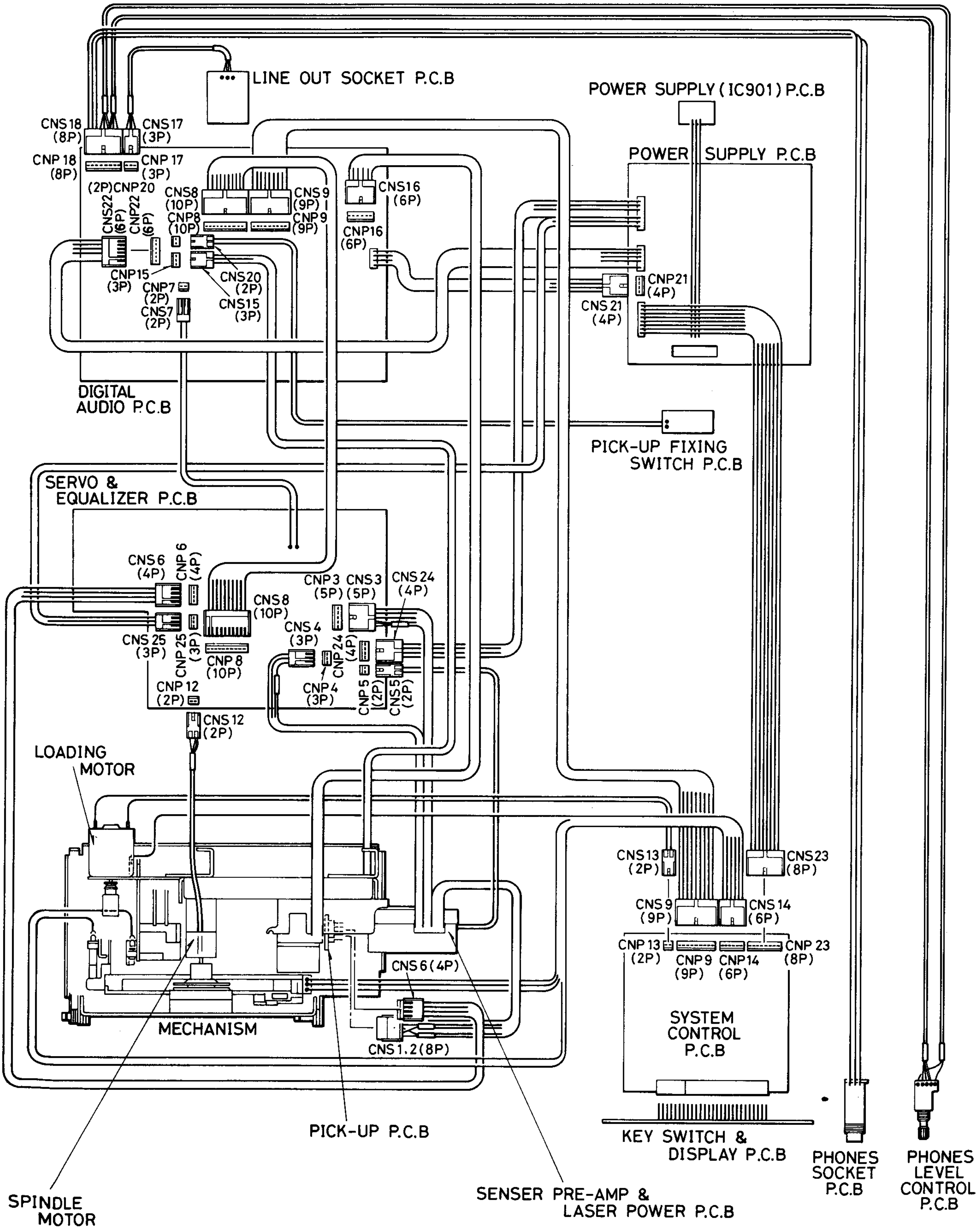
e. Pause adjustment

- Prepare test discs No. 1 and No. 2 for play, and then change from the play mode to the pause mode. When the unit is then switched to the play mode, there will be a deviation shown by the display of the real-time counter at the moment play starts, but this deviation should not exceed 2 seconds. This should be checked at the 1st, 6th and 12th tunes.

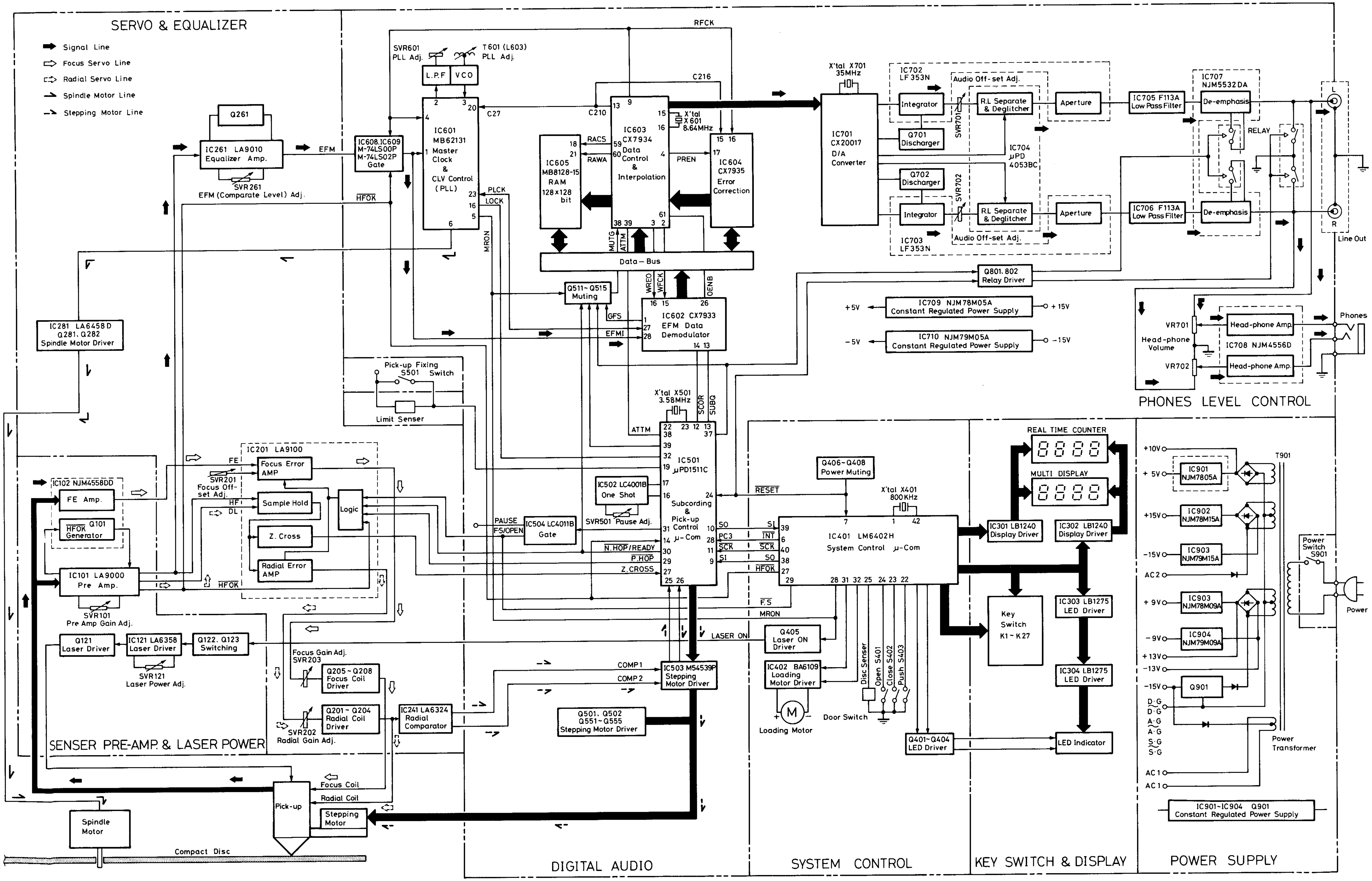
f. Test disc No. 6

- There should be no noise when the 8th tune (10 kHz) of test disc No. 6 is played.
- The EFM adjustment and the minor adjustment to minimize the error rate of C2F2 should be made once again.

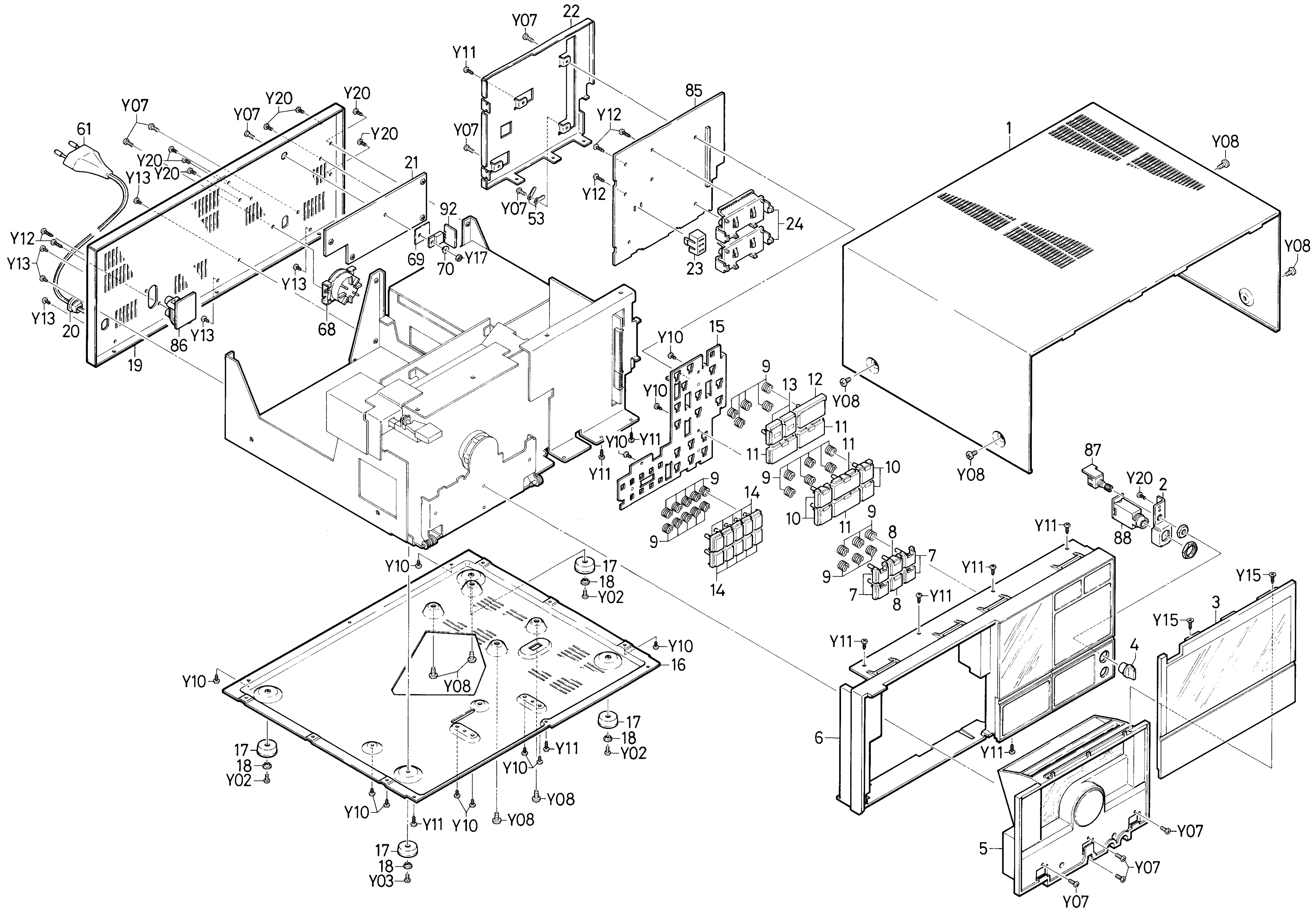
11. PRINTED CIRCUIT BOARD CONNECTIONS


LINE OUT SOCKET P.C.B
POWER SUPPLY (IC901) P.C.B
CNS18 (8P)
CNS17 (3P)
CNP18 (8P)
CNP17 (3P)
POWER SUPPLY P.C.B
(2P) CNP20
CNS8 (10P)
CNS9 (9P)
CNS16 (6P)
CNS22 (6P)
CNP22 (6P)
CNP8 (10P)
CNP9 (9P)
CNP16 (6P)
CNP15 (3P)
CNP7 (2P)
CNS7 (2P)
CNS20 (2P)
CNS15 (3P)
CNP21 (4P)
CNS21 (4P)
DIGITAL AUDIO P.C.B
PICK-UP FIXING SWITCH P.C.B
SERVO & EQUALIZER P.C.B
CNS6 (4P)
CNP6 (4P)
CNS8 (10P)
CNP3 (5P)
CNS3 (5P)
CNS24 (4P)
CNS4 (3P)
CNP24 (4P)
CNS25 (3P)
CNP25 (3P)
CNP8 (10P)
CNP12 (2P)
CNP4 (3P)
CNP5 (2P)
CNS5 (2P)
CNS12 (2P)
LOADING MOTOR
CNS13 (2P)
CNS23 (8P)
CNS9 (9P)
CNS14 (6P)
CNP13 (2P)
CNP9 (9P)
CNP14 (6P)
CNP23 (8P)
CNS6 (4P)
MECHANISM
CNS1.2 (8P)
SYSTEM CONTROL P.C.B
PICK-UP P.C.B
KEY SWITCH & DISPLAY P.C.B
PHONES SOCKET P.C.B
PHONES LEVEL CONTROL P.C.B
SPINDLE MOTOR
SENSER PRE-AMP & LASER POWER P.C.B

12. BLOCK DIAGRAM (FOR ADJUSTMENT)

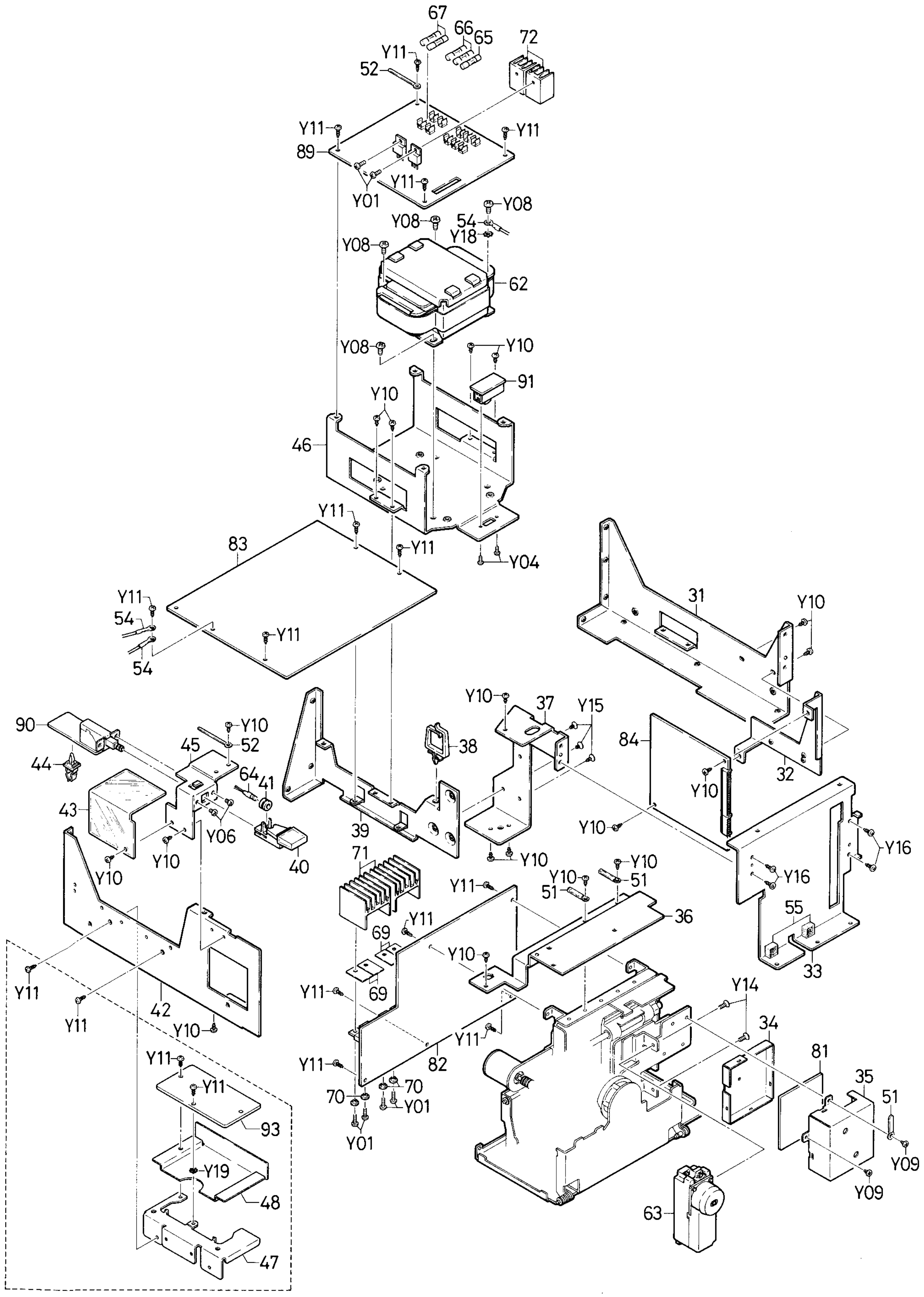

SERVO & EQUALIZER
Signal Line
Focus Servo Line
Radial Servo Line
Spindle Motor Line
Stepping Motor Line
Q261
IC261 LA9010 Equalizer Amp.
SVR261 EFM (Comparate Level) Adj.
EFM
HFOK
IC281 LA6458D Q281, Q282 Spindle Motor Driver
IC102 NJM4558DD
FE Amp.
HFOK Generator
Q101
IC101 LA9000 Pre Amp.
SVR101 Pre Amp Gain Adj.
Q121 Laser Driver
IC121 LA6358 Laser Driver
Q122, Q123 Switching
SVR121 Laser Power Adj.
IC201 LA9100
FE
Focus Error AMP
SVR201 Focus Off-set Adj.
HF
DL
Sample Hold
Logic
Z. Cross
Radial Error AMP
HFOK
Focus Gain Adj. SVR203
Q205~Q208 Focus Coil Driver
Q201~Q204 Radial Coil Driver
SVR202 Radial Gain Adj.
IC241 LA6324 Radial Comparator
SENSER PRE-AMP. & LASER POWER
Focus Coil
Radial Coil
Pick-up
Stepping Motor
Spindle Motor
Compact Disc
SVR601 PLL Adj.
T601 (L603) PLL Adj.
L.P.F
VCO
IC608, IC609 M-74LS00P M-74LS02P Gate
IC601 MB62131 Master Clock & CLV Control (PLL)
PLCK
LOCK
MRON
RFCK
C216
C27
C210
IC605 MB8128-15 RAM 128×128 bit
RACS
RAWA
IC603 CX7934 Data Control & Interpolation
X'tal X601 8.64MHz
PREN
IC604 CX7935 Error Correction
MUTG
ATTM
Data-Bus
Q511~Q515 Muting
WREQ
WFCK
OENB
GFS
EFMI
IC602 CX7933 EFM Data Demodulator
Pick-up Fixing S501 Switch
Limit Senser
X'tal X501 3.58MHz
SCOR
SUBQ
ATTM
IC501 μPD1511C
IC502 LC4001B One Shot
SVR501 Pause Adj.
PAUSE
FS/OPEN
IC504 LC4011B Gate
N.HOP/READY
P.HOP
Z.CROSS
Subcording & Pick-up Control μ-Com
SO
PC3
SCK
SI
LASER ON
COMP1
COMP2
IC503 M54539P Stepping Motor Driver
Q501, Q502 Q551~Q555 Stepping Motor Driver
DIGITAL AUDIO
X'tal X701 35MHz
IC701 CX20017 D/A Converter
IC702 LF353N
Integrator
Audio Off-set Adj.
SVR701
R.L Separate & Deglitcher
Aperture
Q701 Discharger
Q702 Discharger
SVR702
IC704 μPD 4053BC
IC703 LF353N
IC705 F113A Low Pass Filter
IC706 F113A Low Pass Filter
IC707 NJM5532DA
De-emphasis
RELAY
L
R
Line Out
Q801, 802 Relay Driver
+5V
IC709 NJM78M05A Constant Regulated Power Supply
+15V
-5V
IC710 NJM79M05A Constant Regulated Power Supply
-15V
VR701
Head-phone Volume
VR702
Head-phone Amp
IC708 NJM4556D
Phones
PHONES LEVEL CONTROL
Q406~Q408 Power Muting
RESET
X'tal X401 800KHz
IC401 LM6402H System Control μ-Com
INT
SCK
SO
HFOK
F.S
MRON
Q405 Laser ON Driver
IC402 BA6109 Loading Motor Driver
Loading Motor
Disc Senser
Open S401
Close S402
Push S403
Door Switch
Q401~Q404 LED Driver
SYSTEM CONTROL
REAL TIME COUNTER
MULTI DISPLAY
IC301 LB1240 Display Driver
IC302 LB1240 Display Driver
Key Switch K1~K27
IC303 LB1275 LED Driver
IC304 LB1275 LED Driver
LED Indicator
KEY SWITCH & DISPLAY
+10V
+5V
IC901 NJM7805A
+15V
IC902 NJM78M15A
-15V
IC903 NJM79M15A
AC2
+9V
IC903 NJM78M09A
-9V
IC904 NJM79M09A
+13V
-13V
Q901
D·G
A·G
S·G
AC1
T901
Power Switch S901
Power
Power Transformer
IC901~IC904 Q901 Constant Regulated Power Supply
POWER SUPPLY

13. CABINET EXPLODED VIEW



Y07
22
Y11
85
Y07
Y12
Y12
Y07
53
24
23
1
Y08
Y08
61
Y07
Y20
Y20
Y07
Y20
Y20
Y20
Y13
21
92
69
70
Y17
Y12
Y13
Y13
Y13
20
86
Y13
68
19
Y10
15
Y10
Y10
Y11
Y11
11
9
13
12
Y08
11
11
10
9
Y08
9
14
9
14
10
11
9
8
7
9
7
8
87
Y20
2
88
Y11
Y11
Y11
Y15
Y15
3
4
Y11
6
Y11
Y10
17
18
Y02
Y10
16
Y10
Y08
17
18
Y02
Y11
Y10
17
18
Y02
Y08
Y10
Y11
Y10
Y08
17
18
Y03
5
Y07
Y07
Y07

4. CHASSIS EXPLODED VIEW



15. PARTS LIST

PACKING

Ref. No.	Part No.	Description	Q'ty
	141-6-133T-44303	Individual Carton	1
	141-6-144T-89000	Pad, Left	1
	141-6-144T-89100	Pad, Right	1
	141-6-410T-91102	Instruction Manual	1
	141-6-235T-50600	Inner Polyethylene Lamina Bag, Set	1
	141-6-472T-20701	Caution Label, Pick-up Fixing Screw, Cabinet mtg.	1
	141-6-333T-00100	Cleaning Cloth, Compact Disc	1
	4-243T-13371	Lead Cord, LINE OUT	1

CABINET & CHASSIS

Ref. No.	Part No.	Description	Q'ty
1	141-2-111T-55500	Cabinet	1
2	141-2-310T-87300	Bracket, PHONES	1
3	141-0-124T-37504	Top Lid Assembly, Disc Cover	1
4	141-2-163T-89603	Rotary Knob, PHONES LEVEL	1
5	141-0-224T-14100	Bracket Lid Assembly, Disc Holder	1
6	141-0-122T-47203	Front Panel Assembly	1
7	141-2-160T-19900	Push Button, MEMORY/ MEMORY CLEAR/RECAL/ PROGRAM CLEAR	4
8	141-0-160T-19900	Push Button Assembly, PROGRAM WRITE/ PROGRAM PLAY	2
9	141-2-856T-11300	Spring Coil	27
10	141-0-160T-20100	Push Button Assembly, F FWD/ F REW/PAUSE/REPEAT	4
11	141-0-160T-20000	Push Button Assembly, FWD ACCESS/PLAY/ BACK ACCESS/STOP	4
12	141-2-160T-20200	Push Button, OPEN/CLOSE	1
13	141-0-160T-20300	Push Button Assembly, REAL TIME COUNTER	2
14	141-2-160T-19800	Push Button, PROGRAM 1, 2, 3, 4, 5, 6, 7, 8, 9, 0	10
15	141-0-214T-07100	Bracket Frame Assembly, Key Switch	1
16	141-0-125T-30401	Bottom Lid Assembly	1
17	141-2-174T-13600	Stand, Bottom Lid Mtg.	4
18	141-2-462T-77800	Boss, Stand Mtg.	4
19	141-2-126T-42004	Back Lid	1
20	141-2-464T-14400	Fixer, Power Cord Mtg.	1
21	141-2-368T-27200	Heat Sink, IC mtg.	1
22	141-2-315T-26600	Reinforcement, KEY SWITCH & DISPLAY P. C. B	1
31	141-2-315T-26800	Reinforcement, Righ Side	1
32	141-2-310T-86500	Bracket, SYSTEM CONTROL P. C. B.	1
33	141-2-315T-27900	Rinforcement	1
34	141-2-323T-01200	Shield Box, LASER POWER P. C. B. Back	1
35	141-2-323T-01300	Shield Box, LASER POWER P. C. B. Front	1
36	141-2-315T-26500	Reinforcement, Mechanism Top	1
37	141-2-310T-82000	Bracket, Mechanism Right	1
38	141-2-464T-20700	Fixer	1
39	141-2-315T-27700	Reinforcement	1
40	141-0-132T-19900	Sign Window Assembly, Power Switch	1
41	141-2-445T-08701	Rubber Cushion, Pilot Lamp	1
42	141-2-315T-26700	Reinforcement, Left Side	1
43	141-2-135T-88600	Cover, Power Switch	1
44	141-2-464T-43000	Fixer	1
45	141-2-310T-82100	Bracket, Power Switch	1
46	141-2-310T-82200	Bracket, Power Transformer	1
47	141-2-310T-91800	Bracket, Line Filter P. C. B	1
48	141-2-135T-90300	Cover, Line Filter P. C. B.	1
51	123-2-472R-00601	Lug	3
52	141-2-472T-00101	Lug	2
53	123-2-472R-00401	Lug, Capacitor mtg.	2
54	4-237T-11200	Terminal	3
55	141-2-447T-32502	Rubber Cushion, 10 x 10 x 6mm	2
	141-2-453T-06003	Fiber Washer, 3.5 x 10 x 2mm	2
	141-2-247T-19000	Sheet, Front Panel mtg.	3
	141-2-247T-20000	Sheet, 40 x 8.5 x 0.05mm	1
	141-2-246T-88402	Sheet, 20 x 20 x 1mm	1

CABINET & CHASSIS

Ref. No.	Part No.	Description	Q'ty
	141-2-421T-44800	Special Screw, Pick-up Fixing Screw (Shipping Screw)	1
	141-2-184T-02300	UL Tape, Shield Box (Ref. No. 34) mtg., 12 x 25mm	3

HARDWARE

Ref. No.	Part No.	Description	Q'ty
Y01		Pan Hd. Screw, 3 x 8mm	6
Y02		Pan Hd. Forming Screw, 3 x 8mm	3
Y03		Pan Hd. Forming Screw, 3 x 10mm	1
Y04		Binding Hd. Screw, 2.6 x 4mm	2
Y05		(Not used)	
Y06		Pan Hd. Forming Screw 3 x 4mm	2
Y07		Binding Hd. Screw, 3 x 8mm	8
Y08		Binding Hd. Screw, 4 x 8mm	12
Y09		Binding Hd. Tapping Screw, 3 x 4mm	2
Y10		Binding Hd. Tapping Screw, 3 x 6mm	30
Y11		Binding Hd. Tapping Screw, 3 x 8mm	25
Y12		Binding Hd. Tapping Screw, 3 x 10mm	5
Y13		Binding Hd. Forming Screw, 3 x 4mm	6
Y14		Flat Hd. Screw, 3 x 6mm	2
Y15		Flat Hd. Tapping Screw, 3 x 6mm	5
Y16		Pan Hd. Tapping Screw, 3 x 6mm	4
Y17		Nut, 3mm	1
Y18		External Tooth Lock Washer, 4mm	1
Y19		External Tooth Lock Washer, 3mm	1
Y20		Pan Hd. Tapping Screw 3 x 8mm	8

ELECTRICAL PARTS

Ref. No.	Part No.	Description	Q'ty
61	4-243T-84973	⚠Power Cord	1
62(T901)	4-300T-67400	⚠Power Transformer	1
63	4-180T-00200	⚠Pick-up	1
64(PL)	4-612T-14972	Lamp, 8V 100mA, Power Switch	1
65(FU901)	4-234T-10590	⚠Fuse, 3.15A	1
66(FU902,903)	4-234T-10583	⚠Fuse, 800mA	2
67(FU904,905)	4-234T-10587	⚠Fuse, 1.6A	2
68(S902)	4-238T-19171	⚠Switch, Voltage Selector	1
69	141-2-327T-26100	Insulator, IC901 mtg., Back Lid	1
70	141-2-243T-09800	Base, IC901 mtg., Back Lid	1
CNS 6	4-240T-45900	Socket, 4p	1
CNS 8	4-240T-46100	Socket, 10p	1
CNS 9	4-240T-46200	Socket, 9p	1
C773,774		Ceramic, 0.01µF, +80–20% 50V	2

SENSER PRE–AMP. & LASER POWER P. C. B. ASS'Y

Ref. No.	Part No.	Description	Q'ty
81	141-4-250T-90000	P.C.B. Ass'y, Senser Pre-Amp. & Laser Power	1
IC101		Integrated Circuit, LA9000	1
IC102		Integrated Circuit, NJM4558DD	1
IC121		Integrated Circuit, LA6358	1
Q101		Transistor, 2SC536H	1
Q121		Transistor, 2SD612E	1
Q122		Transistor, 2SB598F	1
Q123		Transistor, 2SA608F	1
D101,102		Diode, GMA01	2
D121		Diode, GMA01	1
D122		Diode, GZA5.6Z	1
D123		Diode, GMA01	1
D124		Diode, GZA18Y	1
L121	4-253T-14824	Filter, 22µH	1
	141-2-322T-78600	Shield Plate	1
CNS 1	4-240T-45500	Socket, 5p	1
CNS 4	4-240T-45700	Socket, 3p	1

Ref. No.	Part No.	Description	Q'ty
SENSER PRE–AMP. & LASER POWER P. C. B. ASS'Y			
CNS 3	4-240T-45600	Socket, 5p	1
CNS 5	4-240T-45800	Socket, 2p	1
SVR101	4-220T-04980	Semi-Fixed Resistor, 4.7K ohm	1
SVR121	4-220T-04982	Semi-Fixed Resistor, 10K ohm	1
	RESISTORS All Resistors are Carbon P-type 1/6W, , ±5% unless otherwise noted.		
R101		1.2K ohm	1
R102		3.3K ohm	1
R103		3.3K ohm	1
R104		3.3K ohm	1
R105		3.3K ohm	1
R106		100K ohm	1
R107		100K ohm	1
R108		4.7K ohm	1
R109		22K ohm	1
R110		8.2K ohm	1
R111		1K ohm	1
R112		4.7K ohm	1
R113		47K ohm	1
R121		22 ohm ½W, Flame Proof	1
R122		12K ohm	1
R123		4.7K ohm	1
R124		470K ohm	1
R125		3.9K ohm	1
R126		47K ohm	1
R127		1K ohm	1
R128		4.7K ohm	1
R129		47K ohm	1
R130		18K ohm	1
R131		8.2K ohm	1
R132		1K ohm	1
R133		33K ohm	1
R134		4.7K ohm	1
	CAPACITORS		
C101		Electrolytic 10µF 25V	1
C102		Ceramic 0.01µF +80–20% 50V	1
C103		Electrolytic 47µF 25V	1
C104		Ceramic 0.01µF +80–20% 50V	1
C105		Electrolytic 47µF 25V	1
C106		Ceramic 0.01µF +80–20% 50V	1
C107		Electrolytic 0.22µF 50V	1
C108		Mylar 0.0047µF ±5% 50V	1
C109		Mylar 0.22µF ±10% 50V	1
C121		Tantal 10µF ±20% 10V	1
C122		Mylar 0.01µF ±5% 50V	1
C123		Mylar 0.01µF ±5% 50V	1
C124		Ceramic 0.01µF +80–20% 50V	1
C125		Electrolytic 47µF 25V	1
C126		Electrolytic 47µF 25V	1
SERVO & EQUALIZER P. C. B. ASS'Y			
82	141-4-250T-90100	P.C.B. Ass'y, Servo & Equalizer	1
IC201		Integrated Circuit, LA9100	1
IC241		Integrated Circuit, LA6324	1
IC261		Integrated Circuit, LA9010	1
IC281		Integrated Circuit, LA6458D	1
Q201,205		Transistor, 2SD438E	2
Q202,206		Transistor, 2SB560E	2
Q203,207		Transistor, 2SD613E	2
Q204,208		Transistor, 2SB633E	2
Q261		Transistor, 2SC930E	1
Q281		Transistor, 2SD600E	1
Q282		Transistor, 2SB631E	1
D241,242		Diode, GMA01	2
D281		Diode, GMA01	1
L261,262	4-284T-00600	Delay Line	2
L281	4-252T-13200	Choke Coil, 100µH	1
	123-2-471R-10400	Bead Core, Q261 mtg.	1
69	141-2-327T-26100	Insulator	4
70	141-2-243T-09800	Base	4
71	141-2-368T-26701	Heat Sink	2
TP	141-2-382T-21000	Terminal, Test Point	4

Ref. No.	Part No.	Description	Q'ty
SERVO & EQUALIZER P. C. B. ASS'Y			
	4-236T-13471	Plug, 2p, Lamp	1
CNP 3	4-236T-19773	Plug, 5p	1
CNP 4, 25,	4-236T-19771	Plug, 3p (TP 10)	3
CNP 5, 12	4-236T-19700	Plug, 2p	2
CNP 6, 24	4-236T-19772	Plug, 4p	2
CNS 7	4-240T-46000	Socket, 2p	1
CNP 8	4-236T-19778	Plug, 10p	1
TP 9	4-236T-19774	Plug, 6p	1
TP	4-236T-10293	Plug, 2p	2
TP 1, 5, 13	4-237T-09000	Terminal Board	3
SVR201	4-220T-05082	Semi-Fixed Resistor, 10K ohm	1
SVR202	4-220T-05085	Semi-Fixed Resistor, 33K ohm	1
SVR203	4-220T-05082	Semi-Fixed Resistor, 10K ohm	1
SVR261	4-220T-05082	Semi-Fixed Resistor, 10K ohm	1
	RESISTORS All Resistors are Carbon P-type 1/6W, ±5% unless otherwise noted.		
R202		1.8K ohm	1
R203		47K ohm	1
R204		2.2K ohm	1
R205		56K ohm	1
R206		2.7K ohm	1
R207		2.2K ohm	1
R208		39K ohm	1
R209		1K ohm	1
R210		82K ohm	1
R211		33K ohm	1
R212		100K ohm	1
R213		2.2K ohm	1
R214		820 ohm	1
R215		10K ohm	1
R216		470 ohm	1
R217		2.7K ohm	1
R218		82K ohm	1
R219		3.3K ohm	1
R220		270 ohm	1
R221		2.2K ohm	1
R222		2.2K ohm	1
R223		2.2 ohm ½W, Flame Proof	1
R224		2.2 ohm ½W, Flame Proof	1
R225		39K ohm	1
R226		47K ohm	1
R227		1K ohm	1
R228		8.2K ohm	1
R229		3.3K ohm	1
R230		270 ohm	1
R231		2.2K ohm	1
R232		2.2K ohm	1
R233		2.2 ohm ½W, Flame Proof	1
R234		2.2 ohm ½W, Flame Proof	1
R236		5.6K ohm	1
R238		2.7K ohm	1
R239		3.9K ohm	1
R241		56K ohm	1
R242		56K ohm	1
R243		27K ohm	1
R244		12K ohm	1
R245		120K ohm	1
R246		39K ohm	1
R247		1K ohm	1
R248		100K ohm	1
R249		5.6K ohm	1
R250		5.6K ohm	1
R251		10K ohm	1
R252		10K ohm	1
R258		10K ohm	1
R259		12K ohm	1
R261		3.3K ohm	1
R262		1K ohm	1
R263		1K ohm	1
R264		1K ohm	1
R265		1K ohm	1
R266		1.2K ohm	1
R267		1K ohm	1
R268		1K ohm	1
R269		4.7K ohm	1
R270		100 ohm	1
R271		56 ohm	1

Ref. No.	Part No.	Description	Q'ty
SERVO & EQUALIZER P. C. B. ASS'Y			
	RESISTORS		
R272		10K ohm	1
R273		1K ohm	1
R281		180K ohm	1
R282		12K ohm	1
R283		12K ohm	1
R284		56K ohm	1
R285		33K ohm	1
R286		10K ohm	1
R287		10K ohm	1
R289		1K ohm	1
R291		120 ohm 1W, Metal Oxide	1
	CAPACITORS		
C201		Polypropylene 0.01µF ±5% 100V	1
C202		Polypropylene 0.01µF ±5% 100V	1
C203		Ceramic 33pF ±5% 50V	1
C204		Styrol 120pF ±5% 50V	1
C205		Styrol 120pF ±5% 50V	1
C206		Ceramic 0.01µF +80–20% 50V	1
C207		Mylar 0.0068µF ±5% 50V	1
C208		Electrolytic 0.47µF (NPO) 50V	1
C209		Mylar 0.0068µF ±5% 50V	1
C210		Mylar 0.022µF ±5% 50V	1
C211		Mylar 0.0047µF ±5% 50V	1
C212		Ceramic 0.01µF +80–20% 50V	1
C213		Mylar 0.022µF ±5% 50V	1
C214		Mylar 0.047µF ±5% 50V	1
C215		Mylar 0.15µF ±10% 50V	1
C216		Electrolytic 10µF (NPO) 25V	1
C217		Electrolytic 47µF 16V	1
C218		Ceramic 0.01µF +80–20% 50V	1
C219		Electrolytic 47µF 16V	1
C220		Ceramic 0.01µF +80–20% 50V	1
C222		Electrolytic 1µF (NPO) 50V	1
C224		Ceramic 0.01µF +80–20% 50V	1
C225		Mylar 0.001µF ±5% 50V	1
C226		Mylar 470pF ±10% 50V	1
C227		Electrolytic 4.7µF (NPO) 50V	1
C231		Electrolytic 100µF 16V	1
C232		Electrolytic 100µF 16V	1
C241		Electrolytic 0.47µF(NPO) 50V	1
C242		Electrolytic 1µF (NPO) 50V	1
C243		Electrolytic 0.47µF (NPO) 50V	1
C244		Electrolytic 1µF (NPO) 50V	1
C245		Electrolytic 0.47µF (NPO) 50V	1
C246		Electrolytic 0.47µF (NPO) 50V	1
C261		Polypropylene 0.033µF ±5% 100V	1
C262		Ceramic 33pF ±5% 50V	1
C263		Polypropylene 0.033µF ±5% 100V	1
C264		Ceramic 120pF ±10% 50V	1
C265		Ceramic 56pF ±5% 50V	1
C266		Ceramic 0.01µF +80–20% 50V	1
C267		Ceramic 0.01µF +80–20% 50V	1
C268		Electrolytic 4.7µF 25V	1
C269		Electrolytic 2.2µF 50V	1
C270		Ceramic 0.01µF +80–20% 50V	1
C271		Mylar 0.033µF ±5% 50V	1
C272	4-163T-10900	Electrolytic 4.7µF (NPO) 25V	1
C273		Mylar 0.022µF ±5% 35V	1
C274		Ceramic 0.1µF ±10% 25V BC-type	1
C275		Electrolytic 47µF 16V	1
C276		Ceramic 0.01µF +80–20% 50V	1
C277		Electrolytic 47µF 16V	1
C278		Ceramic 0.01µF +80–20% 50V	1
C281		Mylar 0.012µF ±5% 50V	1
C282		Mylar 0.056µF ±5% 50V	1
C283		Ceramic 0.1µF ±10% 25V BC-type	1
C284		Mylar 0.0022µF ±5% 50V	1
C285		Electrolytic 1µF 50V	1
C286		Electrolytic 47µF 16V	1
C287		Electrolytic 47µF 16V	1
C288		Electrolytic 47µF 16V	1

Ref. No.	Part No.	Description	Q't
DIGITAL AUDIO P. C. B. ASS'Y			
83	141-4-250T-91201	P.C.B. Ass'y, Digital Audio	1
IC501		Integrated Circuit µPD1511C–144	1
IC502		Integrated Circuit LC4001B	1
IC503		Integrated Circuit M54539P	1
IC504		Integrated Circuit LC4011B	1
IC601		Integrated Circuit MB62131	1
IC602		Integrated Circuit CX7933	1
IC603		Integrated Circuit CX7934	1
IC604		Integrated Circuit CX7935	1
IC605		Integrated Circuit MB8128–15	1
IC608		Integrated Circuit M74LS00P	1
IC609		Integrated Circuit N74LS02P	1
IC701		Integrated Circuit CX20017	1
IC702,703		Integrated Circuit LF353N	2
IC704		Integrated Circuit µPD4053BC	1
IC705,706		Integrated Circuit F113A	2
IC707		Integrated Circuit NJM5532DA or NE5532AP	1
IC708		Integrated Circuit NJM4556D	1
IC709		Integrated Circuit NJM78M05A	1
IC710		Integrated Circuit NJM79M05A	1
Q501		Transistor 2SC536 AUD G	1
Q502		Transistor 2SB560E	1
Q511,512, 513,514, 515		Transistor 2SC536 AUD G	5
Q551		Transistor 2SC536 AUD G	1
Q552,553, 554,555		Transistor 2SA984E	4
Q601		FET 2SK222E	1
Q602,603, 604		Transistor 2SC930E	3
Q701,702		FET 2SK152 (3) or 2SK152 (4)	2
Q801,802		Transistor 2SC536 AUD KG	2
D511,521		Diode GMA01	2
D601		Diode 1SV53A	1
D701,702		Diode GZA6.2Y	2
D801,802		Diode GMA01	2
L501	4-253T-12720	Filter 10µH	1
L602,603	4-253T-14828	Filter 47µH	2
L604	4-253T-12714	Filter 3.3µH	1
L701	4-253R-11100	Choke Coil, 1µH	1
T601	4-256T-30430	I. F. T.	1
X501	4-266T-00400	Ceramic Resonator, 3.58MHz	1
X601	4-225T-04200	Crystal, 8.6436MHz	1
X701	4-225T-05300	Crystal, 35.002MHz	1
RY801,802	4-232T-06600	Relay	2
CNP 7,20	4-236T-19700	Plug, 2p	2
CNP 8	4-236T-19778	Plug, 10p	1
CNP 9	4-236T-19777	Plug, 9p	1
CNP 15,17	4-236T-19771	Plug, 3p	2
CNP 16,22	4-236T-19774	Plug, 6p	2
CNP 18	4-236T-19776	Plug, 8p	1
CNS 21	4-240T-46700	Socket, 4p	1
TP 6	4-236T-19772	Plug, 4p	1
TP	141-2-382T-21000	Terminal	11
	4-237T-11200	Terminal Board	2
RA501	4-221T-07776	Resistor, 10K ohm x 9	1
RA502	4-221T-07773	Resistor, 10K ohm x 6	1
RA503	4-221T-07777	Resistor, 10K ohm x 10	1
SVR501	4-220T-04986	Semi-fixed Resistor 47K ohm	1
SVR601	4-220T-04974	Semi-fixed Resistor 470 ohm	1
SVR701,702	4-220T-04984	Semi-fixed Resistor 22K ohm	2
	RESISTORS All Resistors are Carbon P-type 1/6W, ±5% unless otherwise noted.		
R501		10K ohm	1
R502		10K ohm	1
R503		220 ohm	1

DIGITAL AUDIO P. C. B. ASS'Y

Ref. No.	Part No.	Description	Q'ty
	RESISTORS		
R504		10K ohm	1
R505		1K ohm	1
R506		1K ohm	1
R507		27 ohm 2W, Metal Oxide	1
R508		1K ohm	1
R511		82K ohm	1
R512		10K ohm	1
R513		10K ohm	1
R514		10K ohm	1
R515		47K ohm	1
R516		22K ohm	1
R517		47K ohm	1
R518		47K ohm	1
R519		5.6K ohm	1
R521		47K ohm	1
R522		10K ohm	1
R551		33K ohm	1
R552		1K ohm	1
R553		1K ohm	1
R554		1K ohm	1
R555		1K ohm	1
R556		1K ohm	1
R557		1K ohm	1
R558		1K ohm	1
R559		1K ohm	1
R560		10K ohm	1
R561		10K ohm	1
R562		10K ohm	1
R563		10K ohm	1
R601		3.3K ohm	1
R602		3.9K ohm	1
R603		1K ohm	1
R604		10K ohm	1
R605		1K ohm	1
R606		150 ohm	1
R607		1K ohm	1
R608		33K ohm	1
R609		12K ohm	1
R610		2.2K ohm	1
R611		39K ohm	1
R612		8.2K ohm	1
R613		560 ohm	1
R614		100 ohm	1
R615		820 ohm	1
R616		10K ohm	1
R701		100 ohm	1
R702		82K ohm	1
R703		2.7K ohm	1
R704		4.7K ohm	1
R705		4.7K ohm	1
R711,712		15K ohm ±1% ¼W Metal	2
R713,714		18K ohm ±1% ¼W Metal	2
R715,716		4.7K ohm ±1% ¼W Metal	2
R717,718		15K ohm ±1% ¼W Metal	2
R719,720		4.7K ohm ±1% ¼W Metal	2
R721,722		1.8K ohm ±1% ¼W Metal	2
R723,724		12K ohm ±1% ¼W Metal	2
R725,726		330 ohm ±1% ¼W Metal	2
R727,728		150K ohm ±1% ¼W Metal	2
R729,730		100K ohm ±1% ¼W Metal	2
R731,732		470 ohm ±1% ¼W Metal	2
R733,734		1K ohm	2
R735,736		220K ohm	2
R737,738		10K ohm	2
R739,740		3.3K ohm	2
R741,742		220 ohm ¼W Flame Proof	2
R743		390K ohm	1
R752		47 ohm 1W Metal Oxide	1
R801,803		10K ohm	2
R802,804		47K ohm	2
	CAPACITORS		
C501		Ceramic 20pF ±5% 50V	1
C502		Ceramic 20pF ±5% 50V	1
C503		Mylar 0.033µF ±5% 50V	1
C504		Electrolytic 470µF 16V	1
C505		Electrolytic 100µF 10V	1
C506		Ceramic 0.01µF +80–20% 50V	1
C507		Ceramic 0.01µF +80–20% 50V	1
C511		Electrolytic 2.2µF 50V	1
C521		Mylar 0.0022µF ±5% 50V	1
C551		Electrolytic 100µF 16V	1
C552		Electrolytic 100µF 16V	1

DIGITAL AUDIO P. C. B. ASS'Y

Ref. No.	Part No.	Description	Q'ty
	CAPACITORS		
C553		Electrolytic 100µF 16V	1
C554		Electrolytic 100µF 16V	1
C601		Ceramic 39pF ±5% 50V	1
C602		Ceramic 39pF ±5% 50V	1
C603		Mylar 0.033µF ±5% 50V	1
C604		Mylar 0.0015µF ±5% 50V	1
C605		Ceramic 47pF ±5% 50V	1
C606		Ceramic 56pF ±5% 50V	1
C607		Ceramic 56pF ±5% 50V	1
C608		Ceramic 33pF ±5% 50V	1
C609		Ceramic 0.01µF +80–20% 50V	1
C610		Ceramic 0.01µF +80–20% 50V	1
C611		Electrolytic 470µF 10V	1
C612		Ceramic 0.01µF +80–20% 50V	1
C613		Ceramic 0.01µF +80–20% 50V	1
C614		Ceramic 0.01µF +80–20% 50V	1
C615		Ceramic 0.01µF +80–20% 50V	1
C616		Ceramic 0.01µF +80–20% 50V	1
C617		Ceramic 0.01µF +80–20% 50V	1
C618		Ceramic 0.01µF +80–20% 50V	1
C619		Electrolytic 100µF 10V	1
C620		Electrolytic 100µF 10V	1
C621		Ceramic 0.047µF +80–20% 50V	1
C622		Ceramic 0.047µF +80–20% 50V	1
C701		Electrolytic 33µF 16V	1
C702		Electrolytic 33µF 16V	1
C703		Electrolytic 1µF 50V	1
C704		Electrolytic 33µF 16V	1
C705		Electrolytic 4.7µF 25V	1
C706		Electrolytic 33µF 16V	1
C707		Ceramic 47pF ±5% 50V	1
C708		Ceramic 47pF ±5% 50V	1
C709		Ceramic 0.001µF ±10% 50V	1
C710		Ceramic 18pF ±5% 50V	1
C711,712	4-223T-14500	Capacitor 0.001µF	2
C713,714		Electrolytic 1µF 50V	2
C715,716		Mica 68pF ±5% 500V	2
C717,718	4-223T-14300	Capacitor 0.01µF	2
C719,720	4-163T-09400 4-163T-09471	or Electrolytic 4.7µF 50V AR	2
C721,722		Electrolytic 1µF (NPO) 50V	2
C751,752	4-163T-10300 4-163T-10371	or Electrolytic 22µF 25V AR	2
C753		Electrolytic 1µF 50V	1
C754		Electrolytic 100µF 16V	1
C755,756		Electrolytic 100µF 10V	2
C757,758		Electrolytic 1µF 50V	2
C759,760	4-163T-10300 4-163T-10371	or Electrolytic 22µF 25V AR	2
C761,762	4-163T-10300 4-163T-10371	or Electrolytic 22µF 25V AR	2
C763,764	4-163T-10300 4-163T-10371	or Electrolytic 22µF 25V AR	2
C771		Ceramic 0.047µF +80–20% 50V	1
C775		Ceramic 0.047µF +80–20% 50V	1

SYSTEM CONTROL P. C. B. ASS'Y

Ref. No.	Part No.	Description	Q'ty
84	141-4-250T-90301	P.C.B. Ass'y, System Control	1
IC401		Integrated Circuit LM6402H–192	1
IC402		Integrated Circuit BA6109	1
Q401,403		Transistor 2SC536 AUD G	2
Q402,404		Transistor 2SD734 F	2
Q405		Transistor 2SA608 F	1
Q406,407,408		Transistor 2SC536 AUD G	3
D400		Diode DS442 X	1
D401		Diode GZA5.1Y	1
D402		Diode GZA3.3Y	1
D403		Diode DS442 X	1
L401	4-253T-15020	Filter 10µH	1
X401	4-266T-00100	Ceramic Resonator	1
CNP 9	4-236T-19777	Plug, 9P	1
CNP 13	4-236T-19700	Plug, 2p	1
CNP 14	4-236T-19774	Plug, 6p	1
CNP 23	4-236T-19776	Plug, 8p	1
	4-240T-44274	Socket 7p Connection	1
	4-240T-44287	Socket 20p Connection	1
RA401	4-221T-07774	Resistor 10K ohm x 7	1
RA402	4-221T-07773	Resistor 10K ohm x 6	1
RA403	4-221T-07771	Resistor 10K ohm x 4	1

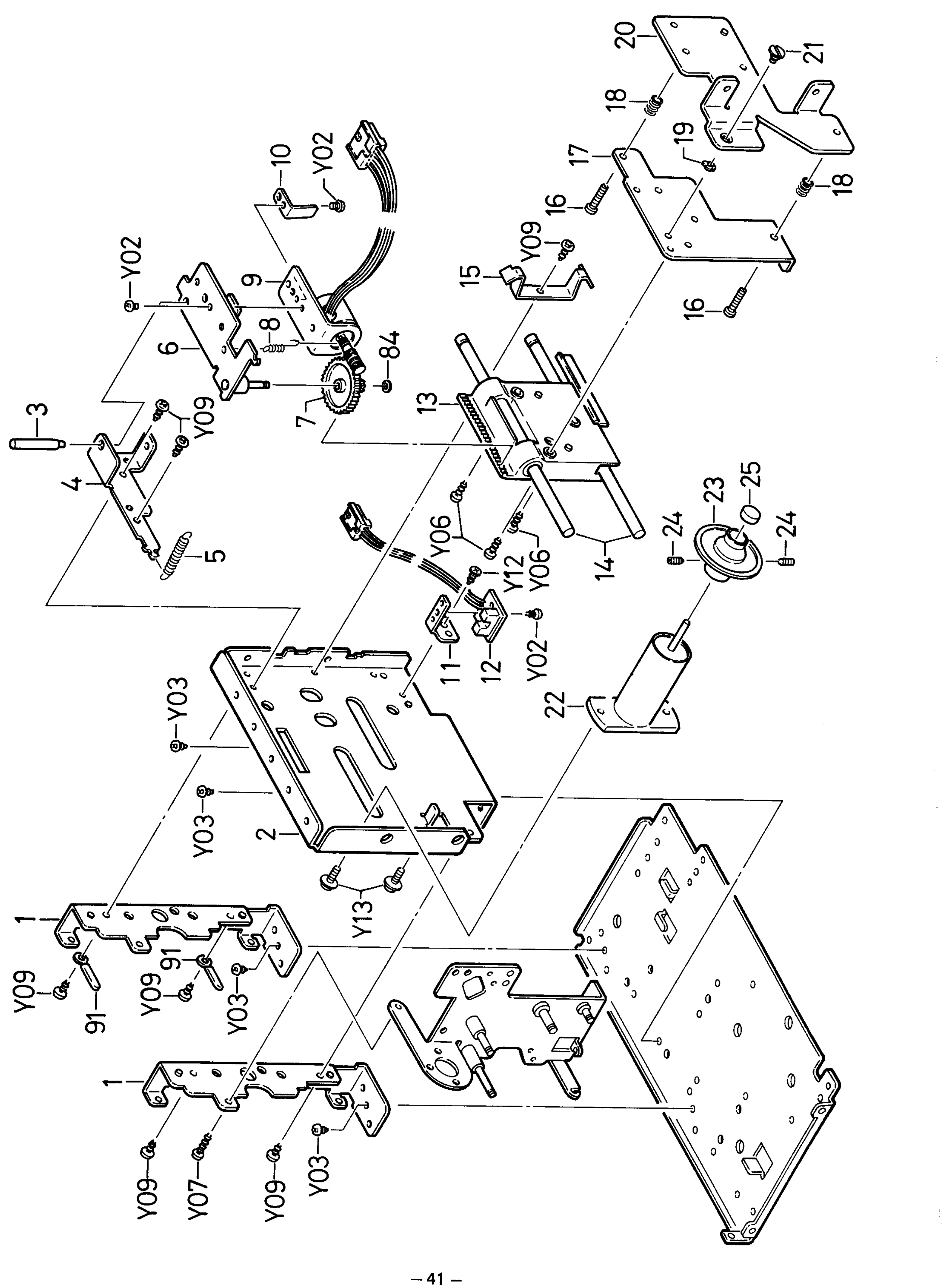
Ref. No.	Part No.	Description	Q'ty
SYSTEM CONTROL P. C. B. ASS'Y			
	RESISTORS All Resistors are Carbon P-type ¼W, ±5% unless otherwise noted.		
R401		1M ohm	1
R402		10K ohm	1
R403		10K ohm	1
R404		330 ohm	1
R406		10K ohm	1
R407		3.9K ohm	1
R408		10K ohm	1
R409		3.9K ohm	1
R410		10K ohm	1
R411		2.2K ohm	1
R412		10K ohm	1
R413		10K ohm	1
R414		100 ohm	1
R415		27K ohm	1
R416		15K ohm	1
R417		5.6K ohm	1
R418		10K ohm	1
R419		100K ohm	1
R420,421, 422		10 ohm ±10% ½W Solid	3
R423		330 ohm	1
	CAPACITORS		
C400		Electrolytic 47μF 25V	1
C401		Cramic 220pF ±5% 50V	1
C402		Ceramic 220pF ±5% 50V	1
C403		Ceramic 0.01μF +80–20% 50V	1
C404		Ceramic 0.01μF +80–20% 50V	1
C405		Ceramic 0.01μF +80–20% 50V	1
C406		Ceramic 0.01μF +80–20% 50V	1
C407		Ceramic 0.01μF +80–20% 50V	1
C408		Ceramic 0.01μF +80–20% 50V	1
C409		Ceramic 0.01μF +80–20% 50V	1
C410		Ceramic 0.01μF +80–20% 50V	1
C411		Ceramic 0.012μF ±10% 25V BC-Type	1
C412		Ceramic 0.022μF +80–20% 50V	1
C413		Electrolytic 33μF 16V	1
C414		Electrolytic 2.2μF 50V	1
C415		Electrolytic 100μF 10V	1
C416		Ceramic 0.01μF +80–20% 50V	1
C417		Electrolytic 47μF 50V	1
C418		Ceramic 0.01μF +80–20% 50V	1
C419		Electrolytic 47μF 25V	1
C420		Ceramic 0.01μF +80–20% 50V	1
C421		Ceramic 100pF ±5% 50V	1
C422		Electrolytic 100μF 10V	1
KEY SWITCH & DISPLAY P. C. B. ASS'Y			
85	141-4-250T-90400	P.C.B. Ass'y, Key Switch & Display	1
IC301,302		Integrated Circuit LB1240	2
IC303,304		Integrated Circuit LB1275	2
LED301,302, 303		LED SLP973BB Red Music No.	3
LED304,305, 306,307, 308,309, 310,311, 312,313, 314,315		LED SLP953BB Red Operation	12
D301,302, 303,304, 305,306, 307,308, 309,310, 311,312, 313,314, 315,316, 317,318, 319,320, 321,322, 323,324, 325,326, 327		Diode DS442 X	27
KEY SWITCH & DISPLAY P. C. B. ASS'Y			
	4-985T-02600	FL Display, COUNTER/ DISPLAY	2
	4-236T-22974	Plug 7p Connection	1
	4-236T-22977	Plug 10p Connection	2
23	141-2-210T-44400	Bracket, LED301,302,303 mtg.	1
24	141-2-210T-44500	Bracket, FL Display Meter	2
K1 ~ 27	4-238T-45700	Switch, KEY SWITCH	27
RA301	4-221T-07774	Resistor 10K ohm x 7	1
	RESISTORS All Resistors are Carbon P-type ¼W, ±5% unless otherwise noted.		
R301,302, 303,304, 305,306, 307,308, 309,310, 311,312, 313,314, 315		100 ohm	15
	CAPACITORS		
C301		Electrolytic 100μF 10V	1
C302		Ceramic 0.01μF +80–20% 50V	1
LINE OUT SOCKET P. C. B. ASS'Y			
86	141-4-250T-90500	P.C.B. Ass'y, Line out Socket	1
	4-240T-35171	Socket, Line out	1
CNS 17	4-240T-46400	Socket, 3p	1
	4-237T-11200	Terminal Board	1
	CAPACITORS		
C772		Ceramic 0.047μF +80–20% 50V	1
PHONES LEVEL CONTROL P. C. B. ASS'Y			
87	141-4-250T-90600	P.C.B. Ass'y, Phones Level Control	1
VR701,702	4-220T-09200	Variable Resistor 50K ohm Phones Level Control	2
CNS 18	4-240T-46500	Socket, 8p	1
PHONES SOCKET P. C. B. ASS'Y			
88	141-4-250T-90700	P.C.B. Ass'y, Phones Socket	1
	4-240T-09171	Socket, Phones	1
POWER SUPPLY P. C. B. ASS'Y			
89	141-4-250T-90871	P.C.B. Ass'y, Power Supply	1
IC902		Integrated Circuit NJM78M15A	1
IC903		Integrated Circuit NJM79M15A	1
IC904		Integrated Circuit NJM78M09A	1
IC905		Integrated Circuit NJM79M09A	1
Q901		Transistor 2SA999F	1
D901	4-202T-05400	⚠Diode DBA30C K12	1
D902		⚠Diode DBA10C	1
D903	4-202T-05500	⚠Diode DBA20C K15	1
D904,905, 906,907, 908,909		⚠Diode DS F10C	6
D910		Diode GZA13Y	1
D911		Diode GZA2.4Z	1
D912		Diode DS442 X	1
CNP 21	4-236T-19772	Plug 4p	1
CNS 22	4-240T-47300	Socket, 6p	1

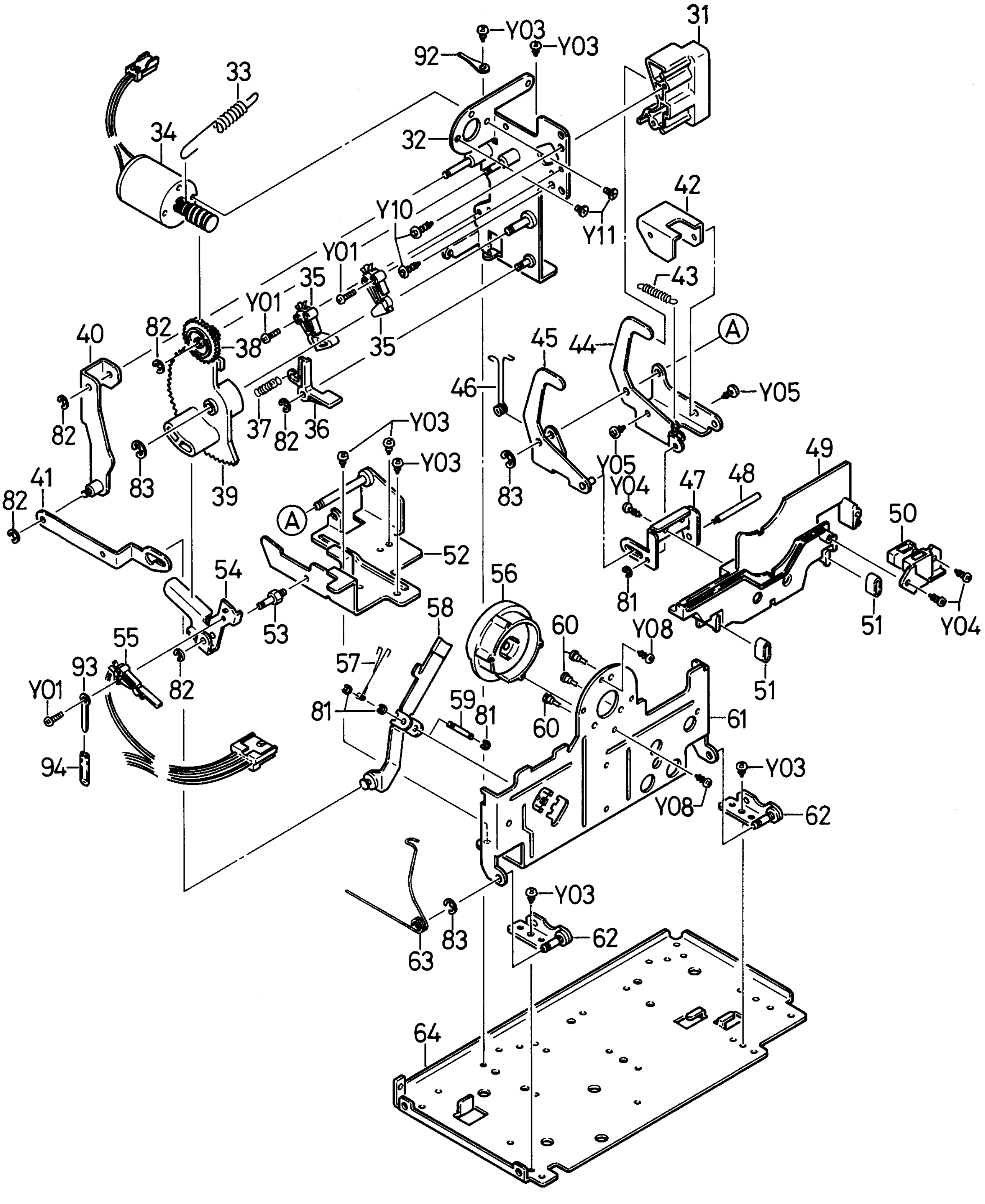
Ref. No.	Part No.	Description	Q'ty
POWER SUPPLY P. C. B. ASS'Y			
CNS 23	4-240T-47000	Socket 8p	1
CNS 24 ,25	4-240T-46900	Socket 4+3p	1
72	141-2-368T-27100	Heat Sink	2
	141-2-381T-04200	Bracket Fuse	10
	4-237T-00100	Terminal Board	11
	4-237T-11200	Terminal Board	1
	RESISTORS All Resistors are Carbon P-type ¼W, ±5% unless otherwise noted.		
R901		2.2K ohm	1
R902		2.2K ohm	1
	CAPACITORS		
C901		Mylar 0.1µF ±20% 50V	1
C902		Ceramic 0.01µF +80–20% 50V	1
C903		Ceramic 0.01µF +80–20% 50V	1
C904		Ceramic 0.01µF +80–20% 50V	1
C905		Ceramic 0.01µF +80–20% 50V	1
C906		Mylar 0.01µF ±20% 250V	1
C907		Mylar 0.01µF ±20% 250V	1
C908	4-163T-10600 or 4-163T-10671	Electrolytic 6800µF 16V	1
C909		Mylar 0.1µF ±20% 50V	1
C910		Mylar 0.1µF ±20% 50V	1
C911		Electrolytic 1µF 50V	1
C912		Electrolytic 1000µF 16V	1
C913	4-163T-10500 or 4-163T-10571	Electrolytic 470µF 25V AR	1
C914	4-163T-09200 or 4-163T-09271	Electrolytic 1000µF 25V AR	1
C915		Electrolytic 1µF 50V	1
C916		Electrolytic 1µF 50V	1
C917	4-163T-09200 or 4-163T-09271	Electrolytic 1000µF 25V AR	1
C918	4-163T-09200 or 4-163T-09271	Electrolytic 1000µF 25V AR	1
C919		Electrolytic 2200µF 16V	1
C920		Electrolytic 2200µF 16V	1
C921		Electrolytic 1µF 50V	1
C922		Electrolytic 1µF 50V	1
C923		Electrolytic 1000µF 16V	1
C924		Electrolytic 1000µF 16V	1
C925		Electrolytic 220µF 35V	1
C926		Electrolytic 220µF 35V	1
C927		Electrolytic 2.2µF 50V	1
C928		Electrolytic 47µF 25V	1
POWER SWITCH P. C. B. ASS'Y			
90	141-4-250T-90971	P.C.B. Ass'y, Power Switch	1
S901	4-238T-64200	⚠ Switch, Power	1
	4-237T-00100	Terminal Board	2
	141-2-382T-18900	Terminal	2
C929	4-223T-12100	⚠ Capacitor, 400V	1
	141-2-135T-75700	Cover, Capacitor mtg.	1
PICK-UP FIXING SWITCH P. C. B. ASS'Y			
91	141-4-250T-91000	P.C.B. Ass'y, Pick-Up Fixing Switch	1
S501	4-238T-66400	Switch, Pick-Up Fixing	1
CNS 20	4-240T-47200	Socket, 2p	1
POWER SUPPLY (IC901) P. C. B. ASS'Y			
92	141-4-250T-91100	P.C.B. Ass'y, Power Supply (IC901)	1
IC901		Integrated Circuit NJM7805A	1
	CAPACITORS		
C951		Electrolytic 1µF 50V	1
C952		Electrolytic 1µF 50V	1

Ref. No.	Part No.	Description	Q'ty
LINE FILTER P. C. B. ASS'Y			
93	141-4-250T-91300	P.C.B. Ass'y, Line Filter	1
L951	4-253T-15800	⚠ Filter 600µH	1
C951,952	4-223T-12172	⚠ Capacitor 0.0022µF	2
C953	4-223T-24500	⚠ Capacitor 0.047µF	1
	141-2-382T-18900	Terminal	4

Safety notice:
All parts bearing the ⚠ symbol were manufactured to conform to special safety standards. When replacing, do not use parts numbers other than those specified.

16. MECHANISM EXPLODED VIEWS


20
21
18
17
19
18
16
16
15
Y09
10
Y02
Y02
9
6
8
84
7
13
3
4
Y09
5
Y06
Y12
Y06
14
24
23
25
24
11
12
Y02
22
Y03
Y03
2
Y13
1
Y09
91
Y09
91
Y03
1
Y09
Y07
Y09
Y03

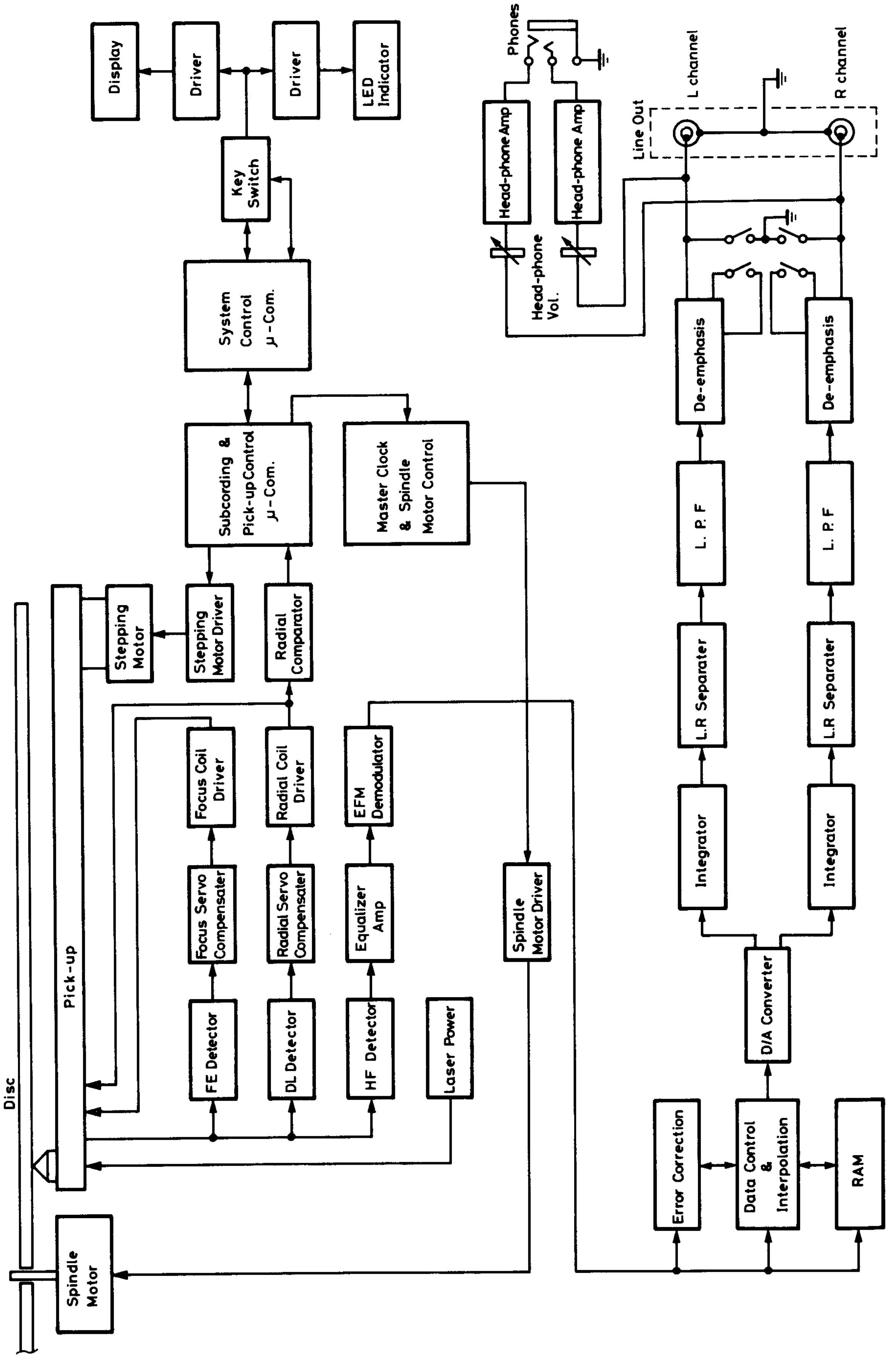

Y03
Y03
Y10
Y11
Y01
Y01
A
Y05
Y03
Y03
Y05
Y04
A
Y04
Y08
Y01
Y03
Y08
Y03

17. MECHANISM PARTS LIST

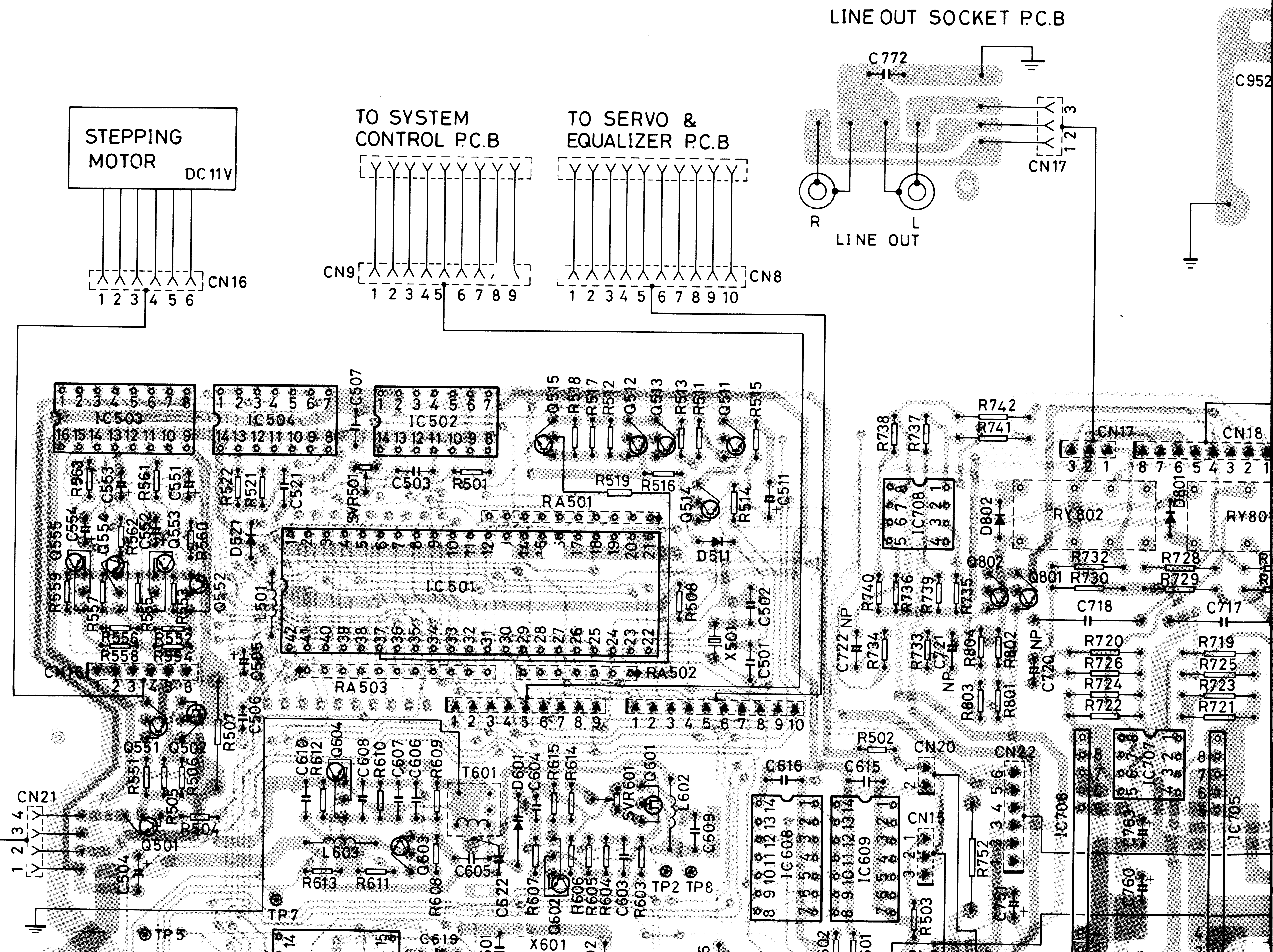
Ref. No.	Part No.	Description	Q'ty
MECHANISM (PM–DAD01)			
1	141-2-310T-82500	Bracket, Chassis	2
2	141-2-311T-43600	Chassis, Pick-up Base	1
3	141-2-754T-38400	Shaft, Stepping Motor	1
4	141-2-747T-24400	Bracket Lever, Stepping Motor	1
5	141-2-856T-11100	Spring Coil	1
6	141-0-742T-95900	Lever Ass'y, Stepping Motor	1
7	141-2-581T-29000	Gear, Helical	1
8	141-2-856T-21300	Spring Coil	1
9	4-527T-20601	Pulse Motor Ass'y, Stepping Motor	1
10	141-2-853T-82000	Spring Plate, Stepping Motor	1
11	141-2-365T-57700	Bracket Switch, Photo Interrupter	1
12	141-4-250T-89900	P.C.B. Ass'y, Limit Switch	1
PC 1	4-202T-50100	├Photo Interrupter	1
	4-240T-45400	└Socket, 3p CNS15	1
13	141-0-581T-28800	Gear Ass'y, Pick-up Base	1
14	141-2-754T-38300	Shaft, Rail	2
15	141-2-853T-81900	Spring Plate, Rail	1
16	141-2-421T-40200	Special Screw, Angle Adjust	2
17	141-2-310T-82300	Bracket, Pick-up Base	1
18	141-2-856T-11200	Spring Coil	2
19	141-2-457T-43700	Special Washer	1
20	141-2-310T-86600	Bracket, Pick-up Base	1
21	141-2-421T-40100	Special Screw, Supporting Point	1
22	4-527T-20401	Commutate Motor Ass'y, Spindle Motor	1
23	141-0-118T-02500	Turn Table Ass'y, Disc	1
24		Hexagon Socket Set Screw 2.6 x 6mm	2
25	141-2-765T-02600	Magnet, Disc	1
31	141-2-671T-07100	Cam, Loading	1
32	141-0-378T-13300	Bracket Motor Ass'y, Loading Motor	1
33	141-2-856T-20600	Spring Coil	1
34	4-527T-20501	Commutate Motor Ass'y, Loading Motor	1
35(S401,402)	4-238T-60000	Switch, Cam Switch OPEN, CLOSE	2
36	141-2-742T-96300	Lever, Push Lever	1
37	141-2-856T-10600	Spring Coil	1
38	141-2-581T-29100	Gear, Herical	1
39	141-2-581T-29200	Gear, Cam	1
40	141-0-742T-96000	Lever Ass'y, Brake Lever	1
41	141-2-743T-08000	Arm, Pull Lever	1
42	141-2-315T-27800	Reinforcement	1
43	141-2-856T-10500	Spring Coil, Brake Stay	1
44	141-2-742T-96100	Lever, Holder Stay	1
45	141-0-742T-96200	Lever Ass'y, Stay Lever	1
46	141-2-856T-10700	Spring Coil	1
47	141-2-310T-82600	Bracket, Holder	1
48	141-2-754T-37500	Shaft, Holder	1
49	141-2-210T-44600	Bracket, Disc Holder	1
50	141-4-250T-89800	P.C.B. Ass'y, Disc Switch	1
PC 2	4-202T-50200	└Photo Interrupter	1
51	141-2-445T-28800	Rubber Cushion, Disc	2
52	141-0-747T-24500	Bracket Lever Ass'y, Stay Bracket	1
53	141-2-421T-40000	Special Screw, Switch Shaft	1
54	141-2-742T-96400	Lever, Switch	1
55(S403)	4-231T-84201	Switch Ass'y, Loading, PUSH	1
56	141-0-661T-36200	Pulley Ass'y, Chuck	1
57	141-2-856T-10900	Spring Coil, Chuch Lever	1
58	141-0-742T-96600	Lever Ass'y,	1
59	141-2-754T-37900	Shaft	1
60	141-2-445T-29300	Rubber Cushion, Chuck	3
61	141-2-742T-96500	Lever, Front	1
62	141-0-747T-24600	Bracket Lever Ass'y, Foot Base	2
63	141-2-856T-10800	Spring Coil	1
64	141-2-311T-43700	Chassis, Bottom	1
81	141-2-457T-23800	Special Washer, "E" Ring 1.5mm	4
82	141-2-457T-23000	Special Washer, "E" Ring 2mm	5
83	141-2-457T-23100	Special Washer, "E" Ring 3mm	
84	141-2-453T-33100	Special Washer 2mm	1
91	123-2-472R-00601	Lug	2
92	141-2-472T-05700	Lug	1
93	141-2-472T-02200	Lug	1
94		Tube, 2φ x 15mm	1

Ref. No.	Part No.	Description	Q'ty
FIXING PARTS			
Y01		Pan Hd. Screw 2 x 8mm	3
Y02		Pan Hd. Screw 2.6 x 3mm	3
Y03		Pan Hd. Forming Screw 3 x 4mm	11
Y04		Pan Hd. Tapping Screw 2.6 x 8mm	5
Y05		Pan Hd. Tapping Screw 3 x 4mm	2
Y06		Pan Hd. Tapping Screw 3 x 8mm	5
Y07		Pan Hd. Tapping Screw 3 x 12mm	1
Y08		Pan Hd. Tapping Screw 2 x 8mm	2
Y09		Binding Hd. Tapping Screw 3 x 6mm	7
Y10		Binding Hd. Tapping Screw 3 x 8mm	2
Y11		Flat Hd. Screw 2.6 x 4mm	2
Y12		Flat Hd. Tapping Screw 3 x 6mm	1
Y13		Pan Screw Washer Hd., 2.6 x 8mm	2

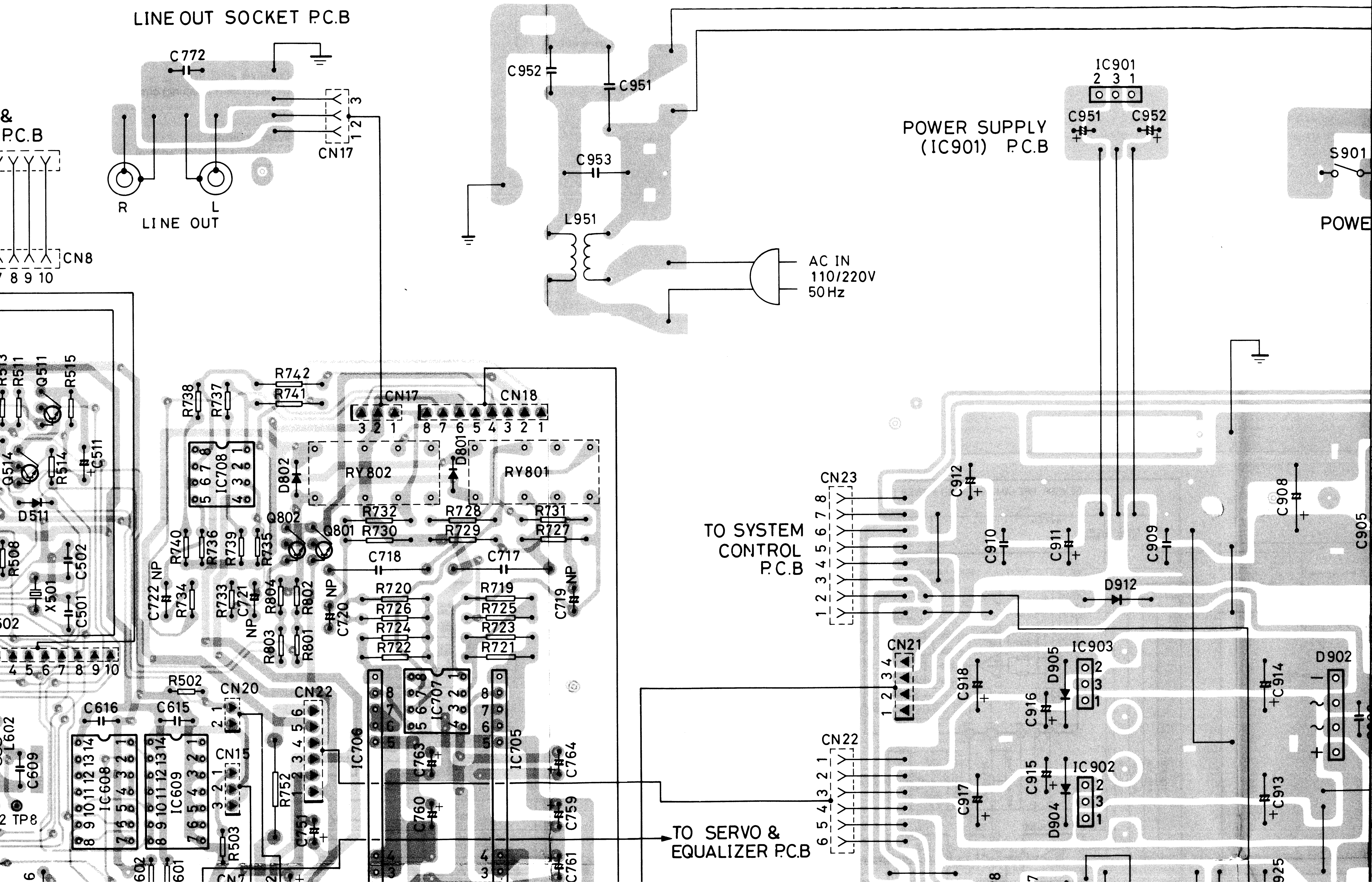
18. BLOCK DIAGRAM

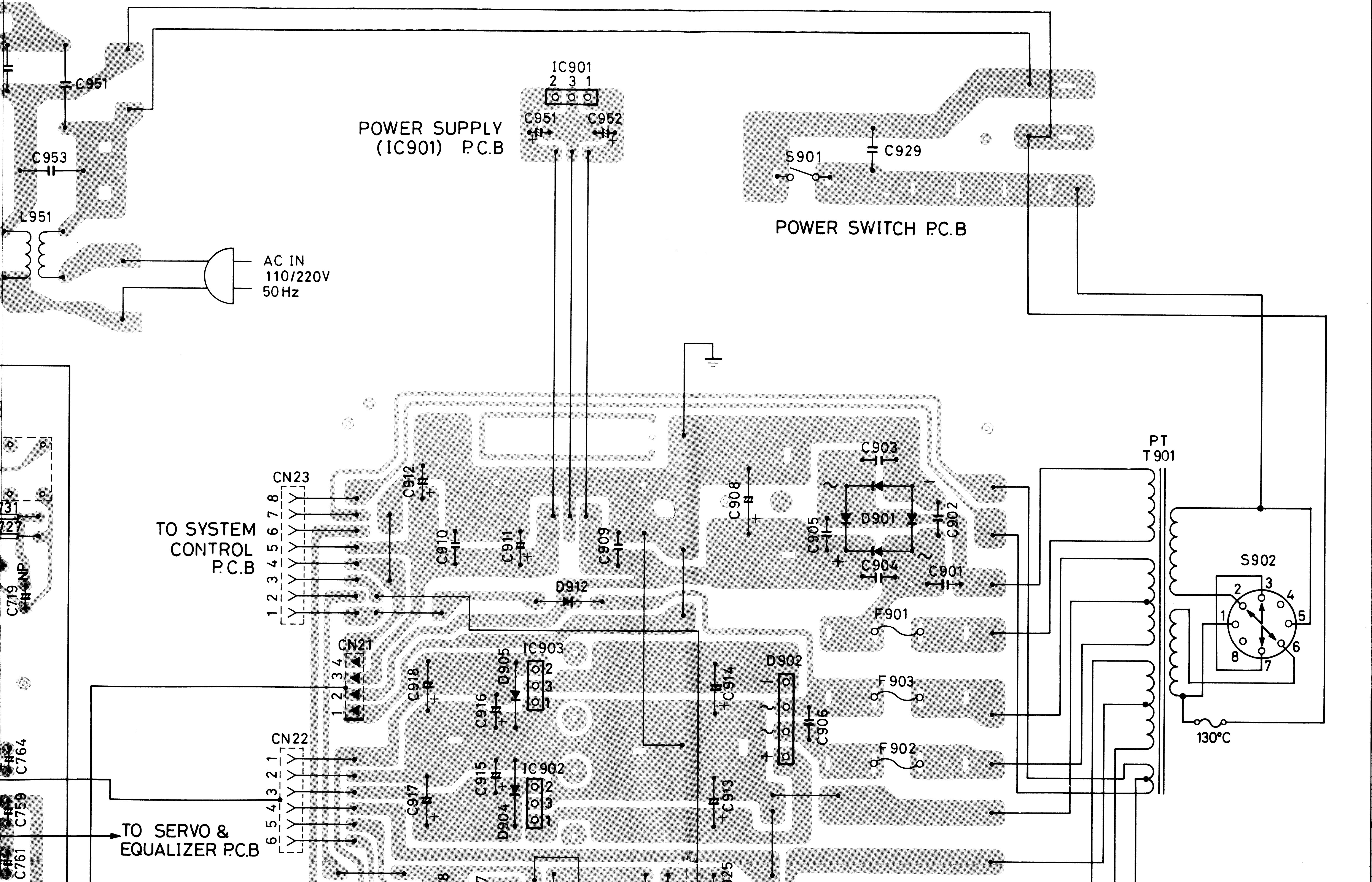

Display
Driver
Driver
LED Indicator
Key Switch
System Control μ-Com.
Subcording & Pick-up Control μ-Com.
Master Clock & Spindle Motor Control
Stepping Motor
Stepping Motor Driver
Radial Comparator
Focus Coil Driver
Radial Coil Driver
EFM Demodulator
Focus Servo Compensater
Radial Servo Compensater
Equalizer Amp
Spindle Motor Driver
FE Detector
DL Detector
HF Detector
Laser Power
Pick-up
Disc
Spindle Motor
Error Correction
Data Control & Interpolation
RAM
D/A Converter
Integrator
Integrator
L.R Separater
L.R Separater
L. P. F
L. P. F
De-emphasis
De-emphasis
Head-phone Amp
Head-phone Amp
Head-phone Vol.
Phones
Line Out
L channel
R channel

WIRING DIAGRAM ① (DIGITAL/AUDIO/POWER SUPPLY)

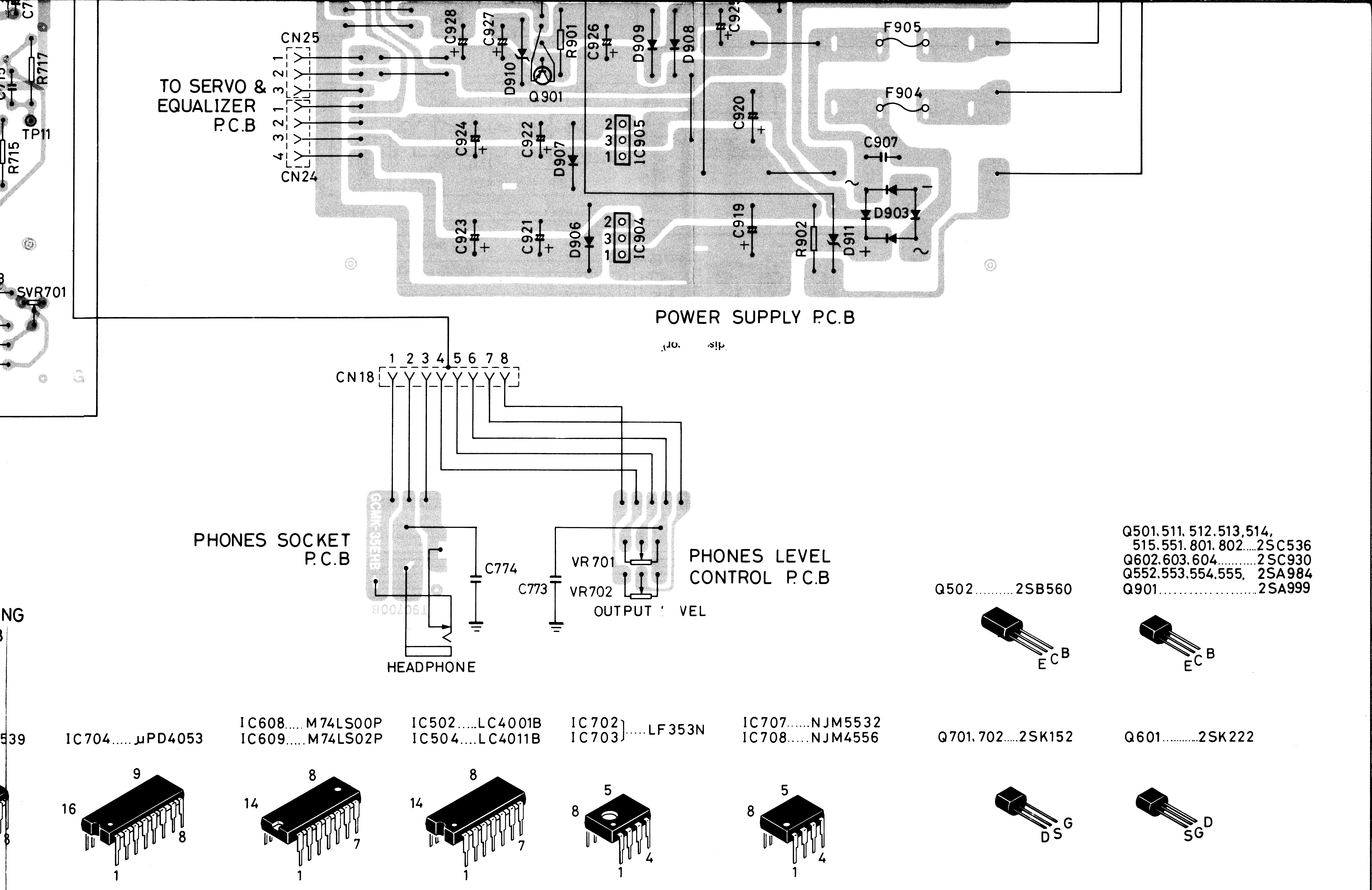

LINE OUT SOCKET P.C.B
C772
C952
CN17
R
L
LINE OUT
STEPPING MOTOR
DC 11V
CN16
TO SYSTEM CONTROL P.C.B
CN9
TO SERVO & EQUALIZER P.C.B
CN8
IC503
IC504
IC502
IC501
C507
Q515
R518
R517
R512
Q512
Q513
R513
R511
Q511
R515
R519
R516
Q514
R514
C511
D511
RA501
RA502
RA503
SVR501
C503
R501
R522
R521
C521
D521
L501
C505
C506
R508
C502
X501
C501
R563
C553
R561
C551
C554
Q555
Q554
C552
R562
Q553
R560
Q552
R559
R557
R555
R553
R556
R552
R558
R554
Q551
Q502
R507
R551
R505
R506
R504
Q501
C504
CN21
TP5
TP7
C610
R612
Q604
C608
R610
C607
C606
R609
T601
L603
Q603
R613
R611
R608
C605
C622
D601
C604
R615
R614
SVR601
Q601
L602
C609
R607
Q602
R606
R605
R604
C603
R603
TP2
TP8
C619
X601
C616
C615
IC608
IC609
R502
CN20
CN15
CN22
R752
C751
R503
IC706
C763
IC707
IC705
C760
R742
R741
R738
R737
CN18
IC708
D802
RY802
D801
RY801
R732
R730
R728
R729
Q802
Q801
R740
R736
R739
R735
C718
C717
C722
NP
R734
R733
C721
R804
R802
C720
R803
R801
R720
R726
R724
R722
R719
R725
R723
R721

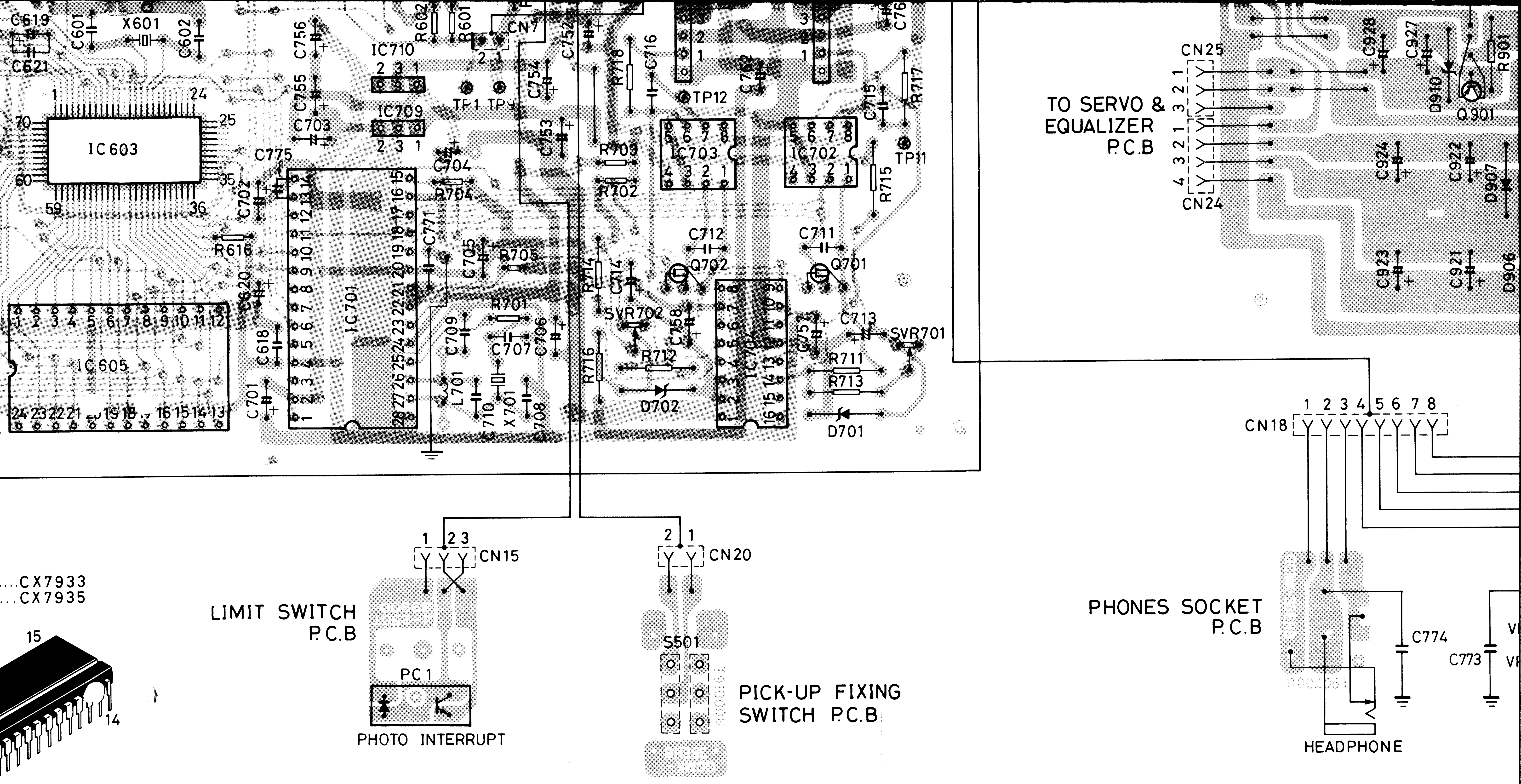
PLY)


LINE OUT SOCKET P.C.B
C772
CN17
R
L
LINE OUT
&
P.C.B
CN8
7 8 9 10
C952
C951
C953
L951
AC IN
110/220V
50Hz
IC901
2 3 1
C951
C952
POWER SUPPLY
(IC901) P.C.B
S901
POWE
R742
R741
R738
R737
CN17
3 2 1
CN18
8 7 6 5 4 3 2 1
IC708
RY802
RY801
D802
D801
R732
R730
R728
R729
R731
R727
Q802
Q801
R740
R736
R739
R735
C718
C717
C722 NP
R734
R733
C721
NP
R804
R802
R803
R801
NP
C720
C719
NP
R720
R726
R724
R722
R719
R725
R723
R721
IC707
IC706
IC705
C763
C764
C760
C759
C761
R752
C751
CN22
CN20
CN15
R502
C616
C615
IC608
IC609
R503
TP8
L602
C609
R513
R511
Q511
R515
Q514
R514
C511
D511
R508
C502
X501
C501
4 5 6 7 8 9 10
CN23
TO SYSTEM CONTROL P.C.B
C912
C910
C911
C909
C908
C905
D912
CN21
C918
C916
D905
IC903
C914
D902
CN22
C917
C915
IC902
C913
D904
TO SERVO & EQUALIZER P.C.B
925

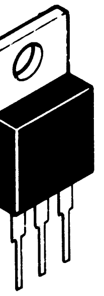


C951
C953
L951
AC IN
110/220V
50Hz
POWER SUPPLY
(IC901) P.C.B
IC901
2 3 1
C951
C952
S901
C929
POWER SWITCH P.C.B
TO SYSTEM
CONTROL
P.C.B
CN23
8 7 6 5 4 3 2 1
C912
C910
C911
C909
C908
D912
C903
C905
D901
C902
C904
C901
F901
F903
F902
PT
T901
S902
1 2 3 4 5 6 7 8
130°C
CN21
1 2 3 4
C918
C916
D905
IC903
2 3 1
C914
D902
C906
CN22
1 2 3 4 5 6
C917
C915
D904
IC902
2 3 1
C913
TO SERVO &
EQUALIZER P.C.B
731
727
C719
NP
C764
C759
C761

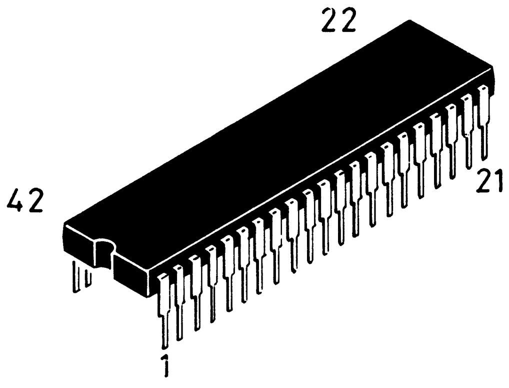

TO SERVO &
EQUALIZER
P.C.B
CN25
CN24
R717
TP11
R715
SVR701
C928
C927
D910
Q901
R901
C926
D909
D908
F905
F904
C924
C922
D907
IC905
C920
C907
D903
C923
C921
D906
IC904
C919
R902
D911
POWER SUPPLY P.C.B
CN18
1 2 3 4 5 6 7 8
PHONES SOCKET
P.C.B
C774
HEADPHONE
C773
VR701
VR702
OUTPUT LEVEL
PHONES LEVEL
CONTROL P.C.B
Q502..........2SB560
Q501, 511, 512, 513, 514,
515, 551, 801, 802.....2SC536
Q602, 603, 604...........2SC930
Q552, 553, 554, 555, 2SA984
Q901......................2SA999
E C B
E C B
NG
539
IC704.....µPD4053
9
16
8
1
IC608.....M74LS00P
IC609.....M74LS02P
8
14
7
1
IC502.....LC4001B
IC504....LC4011B
8
14
7
1
IC702
IC703 .....LF353N
5
8
4
1
IC707.....NJM5532
IC708.....NJM4556
5
8
4
1
Q701, 702.....2SK152
D S G
Q601..........2SK222
S G D


C619
C601
X601
C602
C621
R602
R601
CN7
C752
C716
C762
C76
C756
C755
C703
IC710
IC709
TP1
TP9
C754
C753
R718
TP12
C715
R717
TP11
IC603
1
24
25
70
60
35
59
36
C775
C702
C704
R704
R703
R702
IC703
IC702
R715
R616
C620
C771
C705
R705
C712
Q702
C711
Q701
IC701
R714
C714
SVR702
C758
C757
C713
SVR701
IC605
C618
C701
C709
R701
C707
C706
L701
C710
X701
C708
R712
D702
R716
IC704
R711
R713
D701
CN25
CN24
TO SERVO &
EQUALIZER
P.C.B
C928
C927
R901
D910
Q901
C924
C922
D907
C923
C921
D906
CN18
1 2 3 4 5 6 7 8
CN15
CN20
1 2 3
2 1
....CX7933
....CX7935
15
14
LIMIT SWITCH
P.C.B
PC1
PHOTO INTERRUPT
S501
PICK-UP FIXING
SWITCH P.C.B
PHONES SOCKET
P.C.B
C774
C773
HEADPHONE

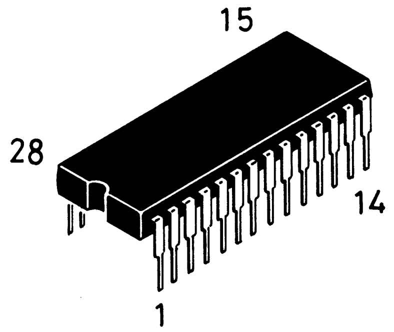
JM78M05A
JM79M05A
JM78M05A
JM78M15A
JM79M15A
JM78M09A
JM79M09A



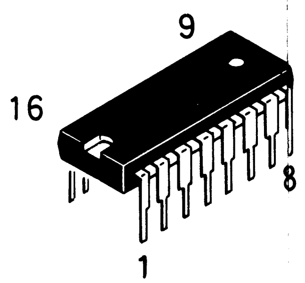
IC501.......μPD1511



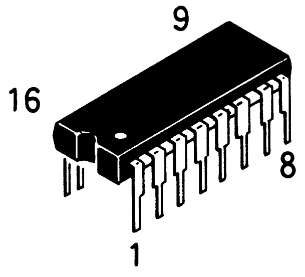
IC701.......CX20017



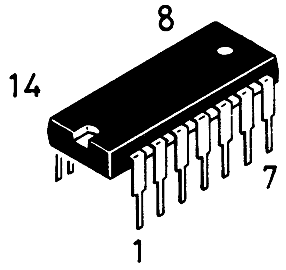
IC503.......M54539



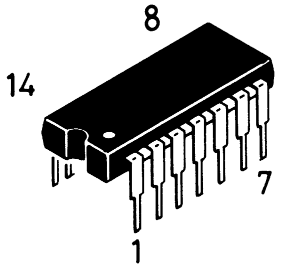
IC704.....μPD4053

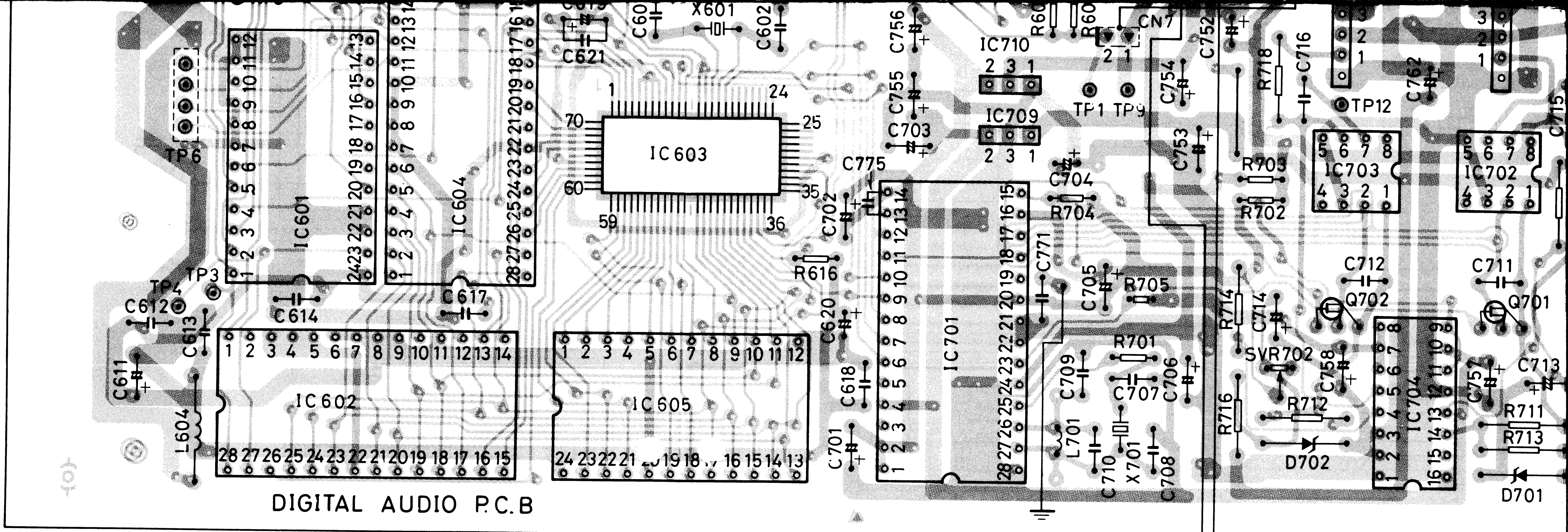


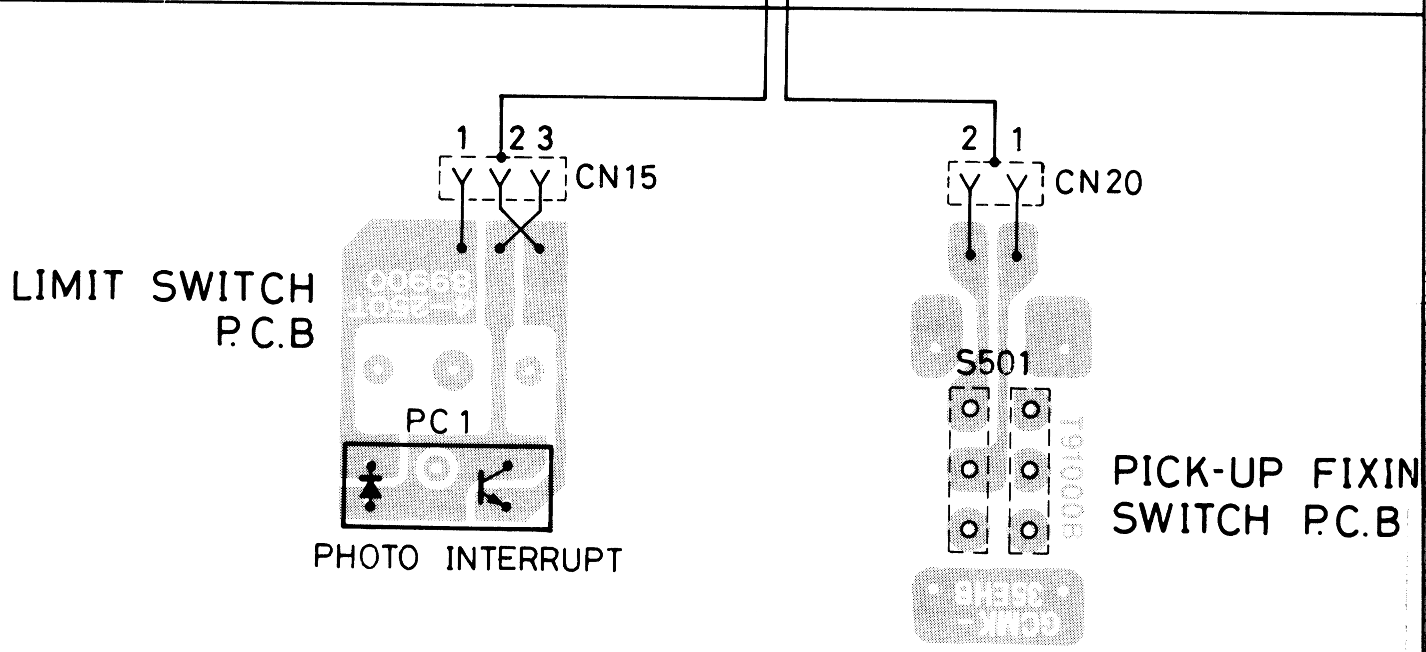
IC608.....M74LS00P
IC609.....M74LS02P



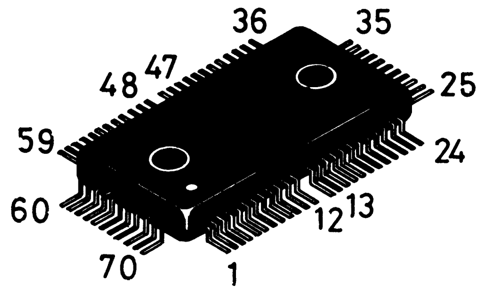
IC502.....LC4001B
IC504....LC4011B



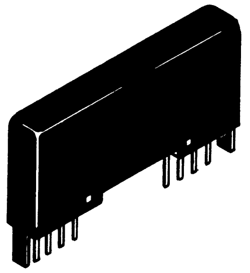

DIGITAL AUDIO P.C.B
IC601
IC602
IC603
IC604
IC605
IC701
IC702
IC703
IC704
IC709
IC710
X601
X701
CN7
TP1
TP3
TP4
TP6
TP9
TP12
C602
C612
C613
C614
C617
C618
C620
C621
C611
C701
C702
C703
C704
C705
C706
C707
C708
C709
C710
C711
C712
C713
C714
C715
C716
C752
C753
C754
C755
C756
C757
C758
C762
C771
C775
R616
R701
R702
R703
R704
R705
R711
R712
R713
R714
R716
R718
SVR702
Q701
Q702
D701
D702
L604
L701


1 2 3 CN15
2 1 CN20
LIMIT SWITCH P.C.B
PC1
PHOTO INTERRUPT
S501
PICK-UP FIXIN
SWITCH P.C.B

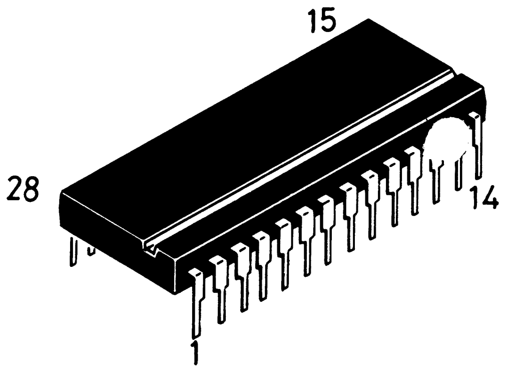
IC603.........CX7934


36
35
48
47
25
59
24
60
12
13
70
1

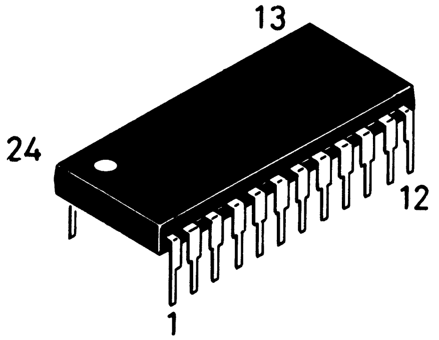
IC705, 706.....F113A



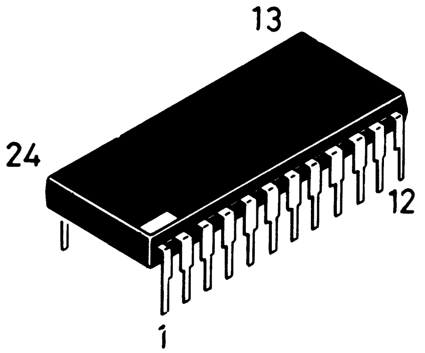
IC602........CX7933
IC604........CX7935



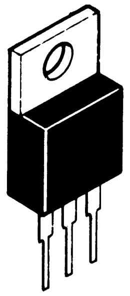
IC601.........MB62131



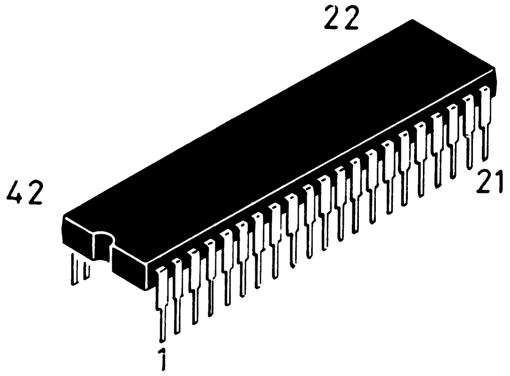
IC605.....MB8128-15



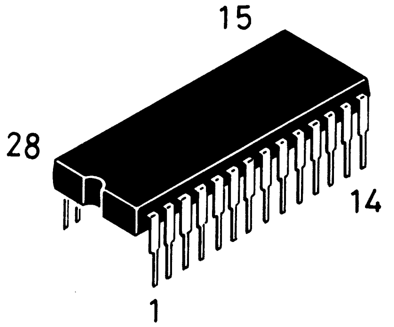
IC709.....NJM78M05A
IC710.....NJM79M05A
IC901.....NJM78M05A
IC902.....NJM78M15A
IC903.....NJM79M15A
IC904.....NJM78M09A
IC905.....NJM79M09A



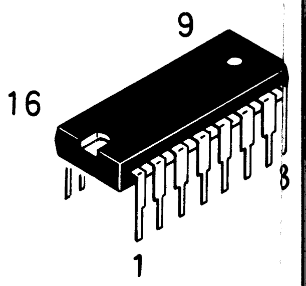
IC501........μPD1511



IC701.......CX20017



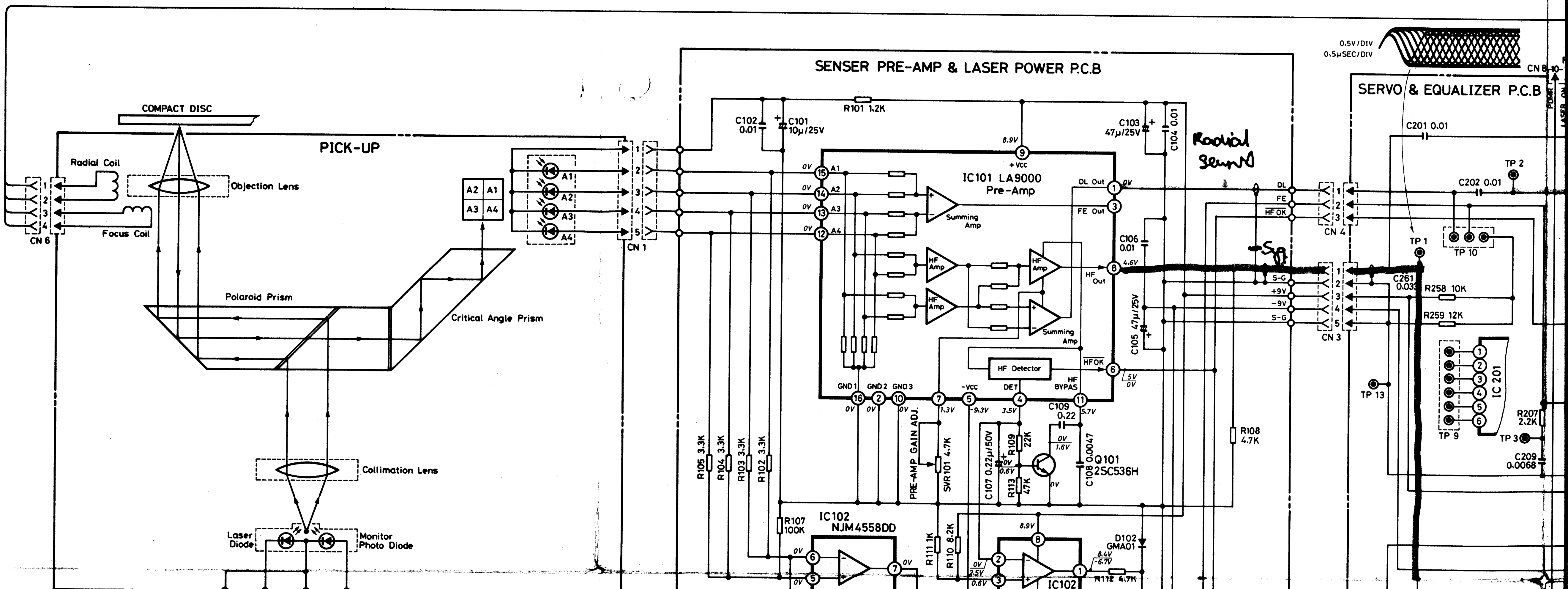
IC503.......M545



SCHEMATIC DIAGRAM ② (PICKUP/SERVO/SYSTEM CONTROL/DISPLAY)

FUNCTIONS OF PRINCIPAL PARTS

Pick-up	■ Laser pick-up [laser diode, monitor photodiode, 4-split photodiode (disc sensor), focus servo coil, radial servo coil]
Q121	■ Laser diode driver
IC303·304	■ LED driver
IC101	■ Sensor signal preamplifier [HF 9High Frequency) signal, DE (Desition Level) signal Sensor signal preamplifier (FE signal, HFOK signal generation)
IC102	■ Sensor signal preamplifier [FE signal, HFOK signal generati
IC121	■ Laser power control
Q122·123	■ Switching circuit for laser power control
Q401～404	■ LED driver

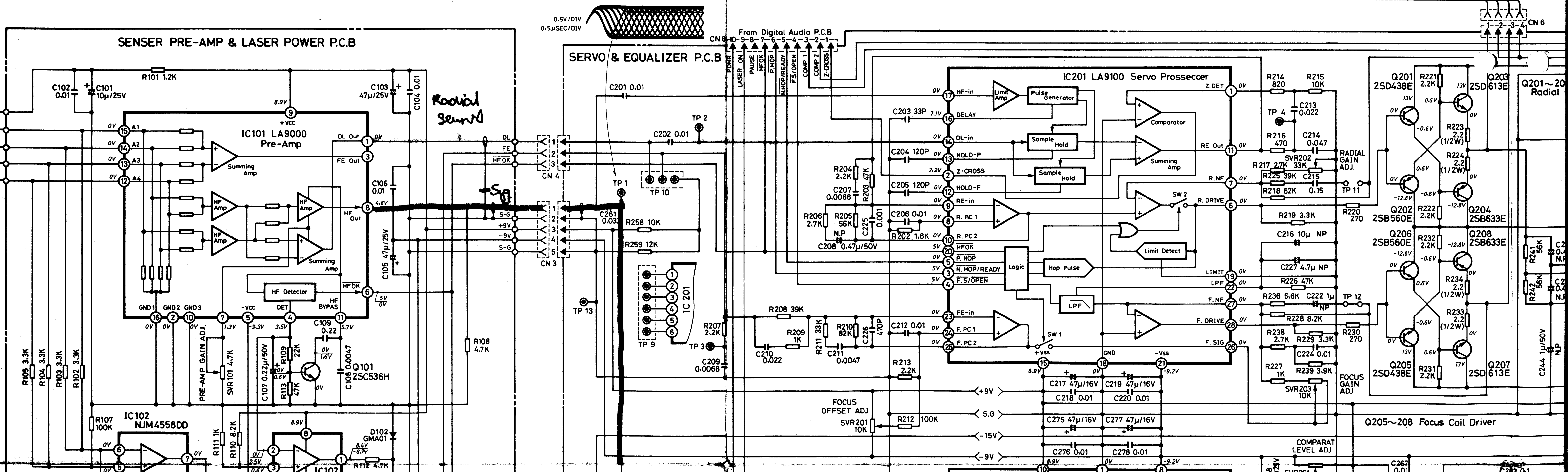


SENSER PRE-AMP & LASER POWER P.C.B
SERVO & EQUALIZER P.C.B
COMPACT DISC
PICK-UP
Radial Coil
Focus Coil
CN 6
Objection Lens
Polaroid Prism
Critical Angle Prism
Collimation Lens
Laser Diode
Monitor Photo Diode
A1
A2
A3
A4
CN 1
C102 0.01
C101 10μ/25V
R101 1.2K
C103 47μ/25V
C104 0.01
IC101 LA9000
Pre-Amp
+VCC
8.9V
Summing Amp
HF Amp
HF Detector
DL Out
FE Out
HF Out
HFOK
HF BYPAS
GND 1
GND 2
GND 3
-VCC
DET
C106 0.01
C105 47μ/25V
C109 0.22
Q101 2SC536H
C108 0.0047
R109 22K
R113 47K
C107 0.22μ/50V
SVR101 4.7K
PRE-AMP GAIN ADJ.
R105 3.3K
R104 3.3K
R103 3.3K
R102 3.3K
R107 100K
IC102 NJM4558DD
R111 1K
R110 8.2K
D102 GMA01
R112 4.7K
R108 4.7K
Radial Sensor
Sig
DL
FE
HF OK
CN 4
S-G
+9V
-9V
S-G
CN 3
0.5V/DIV
0.5μSEC/DIV
CN 8
C201 0.01
C202 0.01
TP 1
TP 2
TP 10
TP 13
TP 9
TP 3
C261 0.033
R258 10K
R259 12K
IC 201
R207 2.2K
C209 0.0068

STEM CONTROL/DISPLAY)

IC101	■ Sensor signal preamplifier [HF 9High Frequency) signal, DE (Desition Level) signal Sensor signal preamplifier (FE signal, HFOK signal generation)]
IC102	■ Sensor signal preamplifier [FE signal, HFOK signal generation]
IC121	■ Laser power control
Q122·123	■ Switching circuit for laser power control
Q401～404	■ LED driver

IC201	■ Servo control [Radial error detection, Z CROSS signal generation, radial servo control, focus servo control]
IC202	■ Equalizer amplifier [equivalent (shaping) circuit changes HF signal into EFM signal]
IC401 (microcomputer)	■ System control [loading function control, pick-up control command dependent on key switch, counter mode display, display and indicator control. laser and spindle motor ON/OFF command. focus search (focal point detection) HFOK signal supervision, key switch input control, mechanism switch supervision, display of subcode signal and control signal generation based on contents of subcode signal, system's operation control signal generation based on above inputs, reset circuit dependent on initializing signal]
IC402	■ Loading motor driver



SENSER PRE-AMP & LASER POWER P.C.B
SERVO & EQUALIZER P.C.B
0.5V/DIV
0.5μSEC/DIV
Radial Servo
~Sg
IC101 LA9000 Pre-Amp
Summing Amp
HF Amp
HF Detector
DL Out
FE Out
HF Out
HFOK
HF BYPAS
GND 1
GND 2
GND 3
-VCC
DET
+VCC
A1
A2
A3
A4
R101 1.2K
C102 0.01
C101 10μ/25V
C103 47μ/25V
C104 0.01
C106 0.01
C105 47μ/25V
C109 0.22
C108 0.0047
Q101 2SC536H
C107 0.22μ/50V
R109 22K
R113 47K
SVR101 4.7K
PRE-AMP GAIN ADJ.
R105 3.3K
R104 3.3K
R103 3.3K
R102 3.3K
R107 100K
R108 4.7K
R111 1K
R110 8.2K
IC102 NJM4558DD
D102 GMA01
R112 4.7K
CN 4
CN 3
DL
FE
HF OK
S-G
+9V
-9V
TP 1
TP 2
TP 3
TP 9
TP 10
TP 13
IC 201
C201 0.01
C202 0.01
C261 0.033
R258 10K
R259 12K
R207 2.2K
C209 0.0068
CN 8
From Digital Audio P.C.B
PDMR
LASER ON
PAUSE
HFOK
P.HOP
N.HOP/READY
F.S/OPEN
COMP 1
COMP 2
Z.CROSS
IC201 LA9100 Servo Prosseccer
HF-in
DELAY
DL-in
HOLD-P
Z-CROSS
HOLD-F
RE-in
R. PC 1
R. PC 2
P. HOP
N. HOP/READY
F. S/OPEN
HFOK
FE-in
F. PC 1
F. PC 2
+VSS
GND
-VSS
Z.DET
RE Out
R. NF
R. DRIVE
LIMIT
LPF
F. NF
F. DRIVE
F. SIG
Limit Amp
Pulse Generator
Sample Hold
Comparator
Summing Amp
Logic
Hop Pulse
Limit Detect
LPF
SW 1
SW 2
C203 33P
C204 120P
C205 120P
C206 0.01
C207 0.0068
C208 0.47μ/50V
R202 1.8K
R203 47K
R204 2.2K
R205 56K
R206 2.7K
C225 0.001
R208 39K
R209 1K
R210 82K
R211 33K
C210 0.022
C211 0.0047
C212 0.01
C226 470P
R213 2.2K
FOCUS OFFSET ADJ
SVR201 10K
R212 100K
+9V
S.G
-15V
-9V
C217 47μ/16V
C218 0.01
C219 47μ/16V
C220 0.01
C275 47μ/16V
C276 0.01
C277 47μ/16V
C278 0.01
R214 820
R215 10K
TP 4
C213 0.022
R216 470
C214 0.047
SVR202 33K
RADIAL GAIN ADJ.
R217 2.7K
R225 39K
C215 0.15
R218 82K
TP 11
R219 3.3K
R220 270
C216 10μ NP
C227 4.7μ NP
R226 47K
R236 5.6K
C222 1μ NP
TP 12
R228 8.2K
R238 2.7K
R229 3.3K
R230 270
C224 0.01
R227 1K
R239 3.9K
SVR203 10K
FOCUS GAIN ADJ
COMPARAT LEVEL ADJ
Q201 2SD438E
Q202 2SB560E
Q203 2SD613E
Q204 2SB633E
Q205 2SD438E
Q206 2SB560E
Q207 2SD613E
Q208 2SB633E
R221 2.2K
R222 2.2K
R223 2.2 (1/2W)
R224 2.2 (1/2W)
R231 2.2K
R232 2.2K
R233 2.2 (1/2W)
R234 2.2 (1/2W)
Q201～20 Radial
Q205～208 Focus Coil Driver
CN 6
R241 56K
R242 56K
C244 1μ/50V NP

]

tion]

IC201
- Servo control
  [Radial error detection, Z CROSS signal generation, radial servo control, focus servo control]

IC202
- Equalizer amplifier
  [equivalent (shaping) circuit changes HF signal into EFM signal]

IC401
(microcomputer)
- System control
  [loading function control, pick-up control command dependent on key switch, counter mode display, display and indicator control. laser and spindle motor ON/OFF command. focus search (focal point detection) HFOK signal supervision, key switch input control, mechanism switch supervision, display of subcode signal and control signal generation based on contents of subcode signal, system's operation control signal generation based on above inputs, reset circuit dependent on initializing signal]

IC402
- Loading motor driver

Q201～204
- Radial coil driver

Q205～208
- Focus coil driver

IC241
- Radial comparator
  [detects variation of radial coil (the detected signal is the stepping motor braking determination signal)]

Q261
- Equalizer amplifier circuit [Bessel filter circuit]

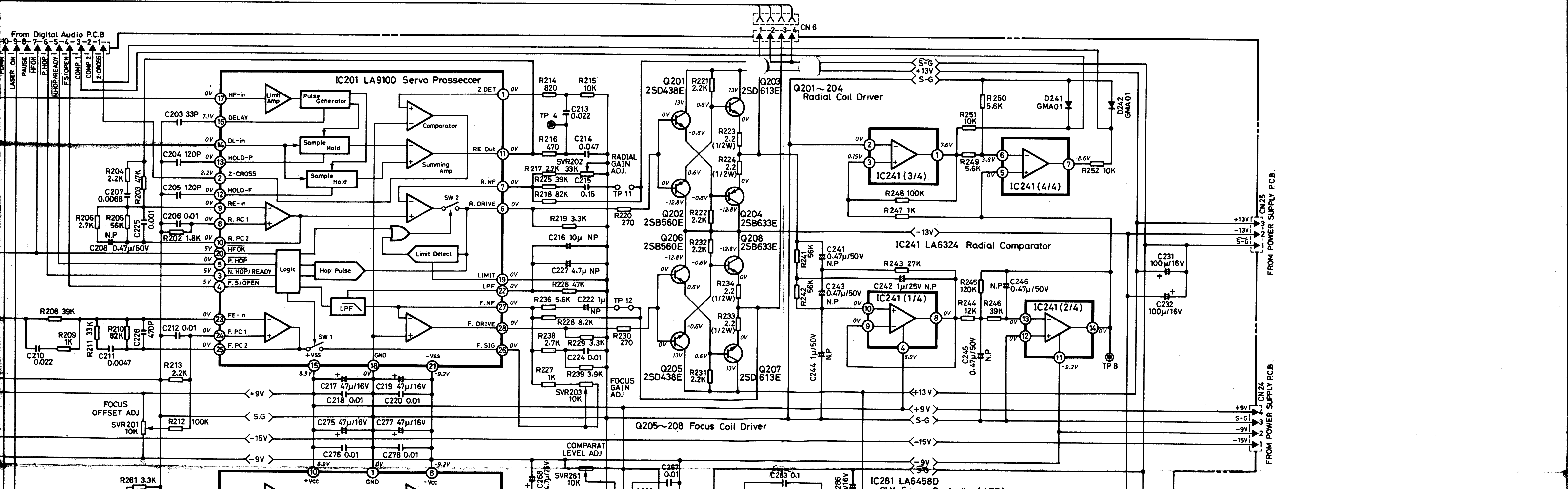
IC281
- Spindle motor drive control

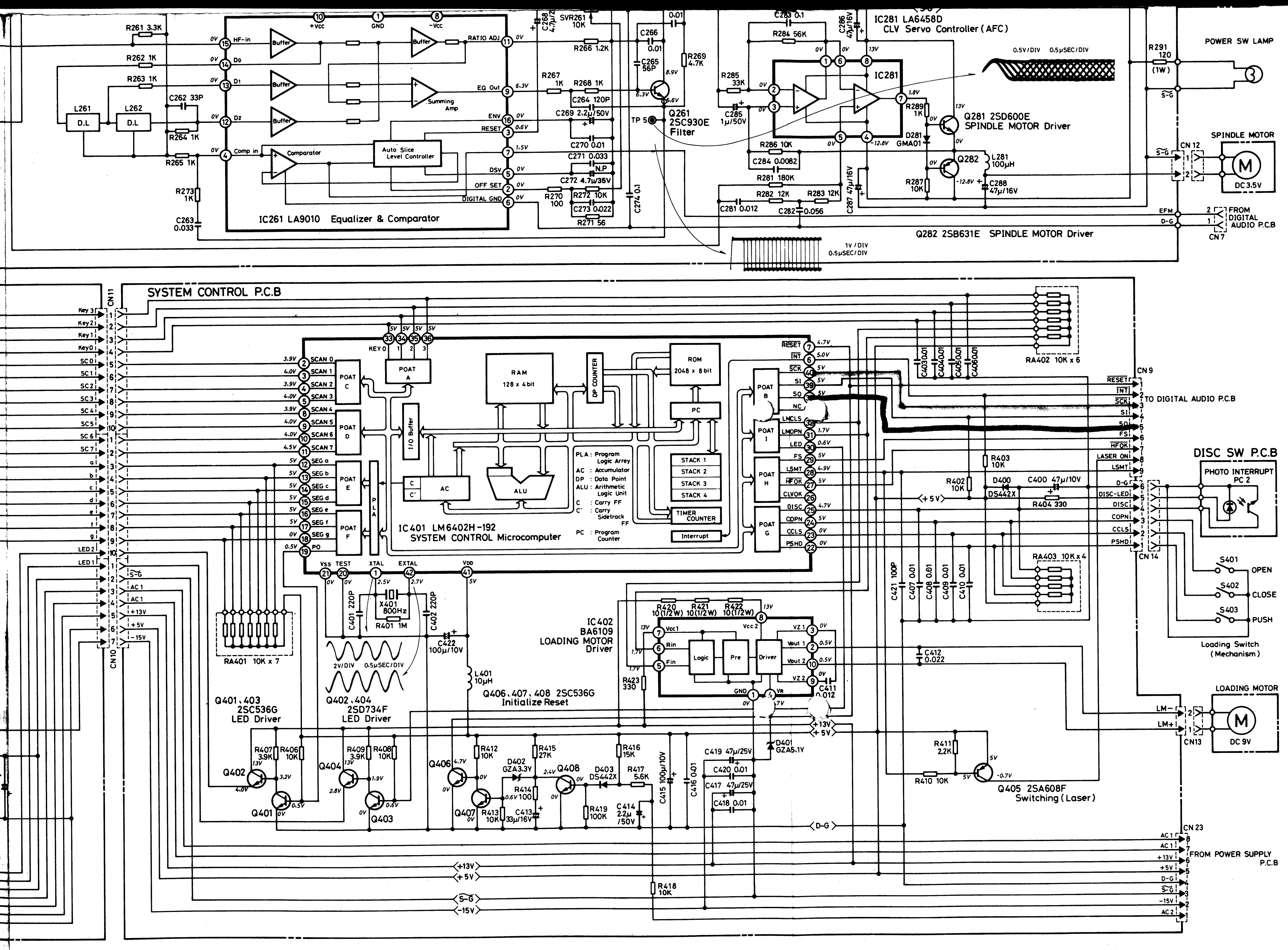
Q281·282
- Spindle motor driver

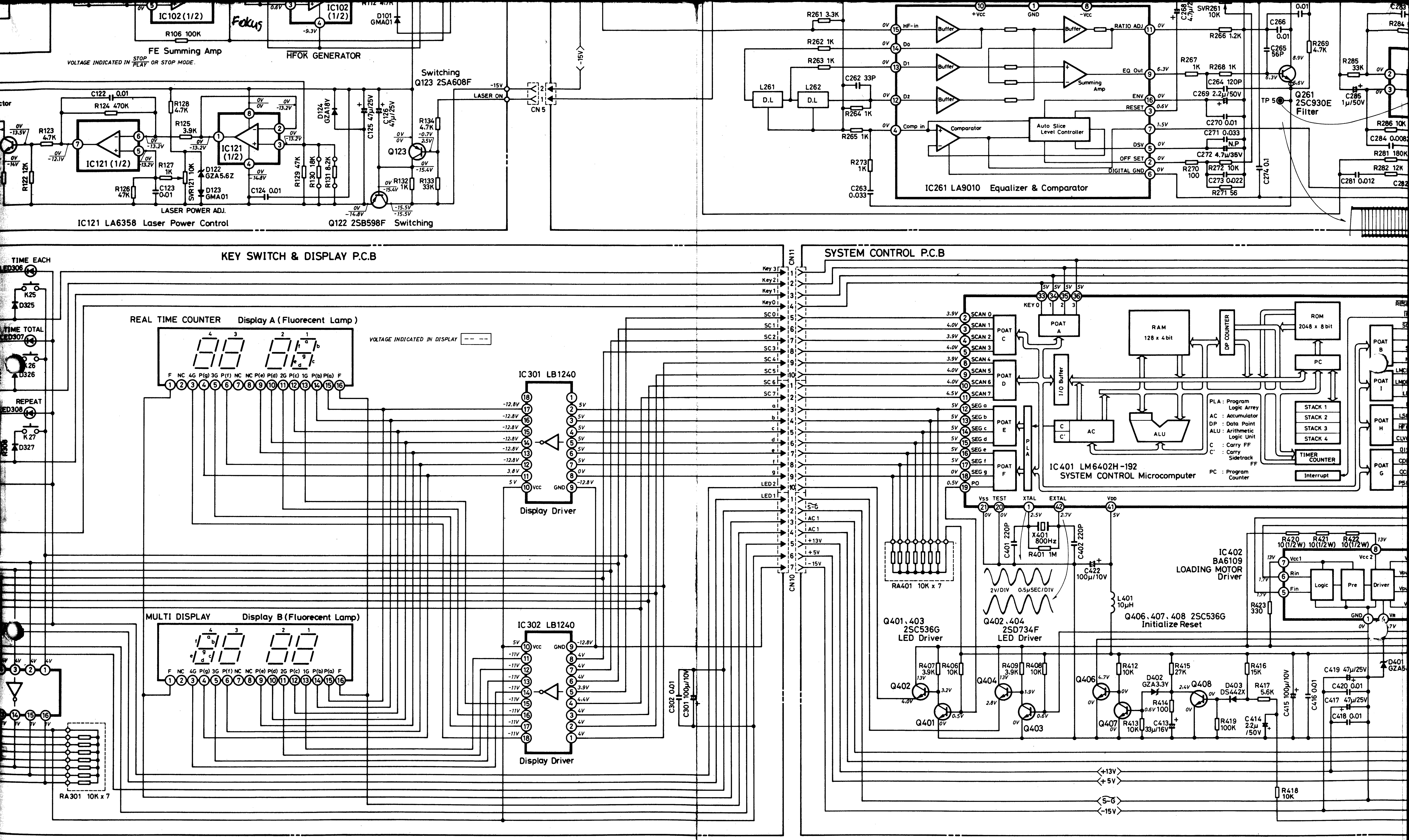
Q406～408
- Initializing reset circuit [IC401 and IC501 reset, relay drive (mute)]

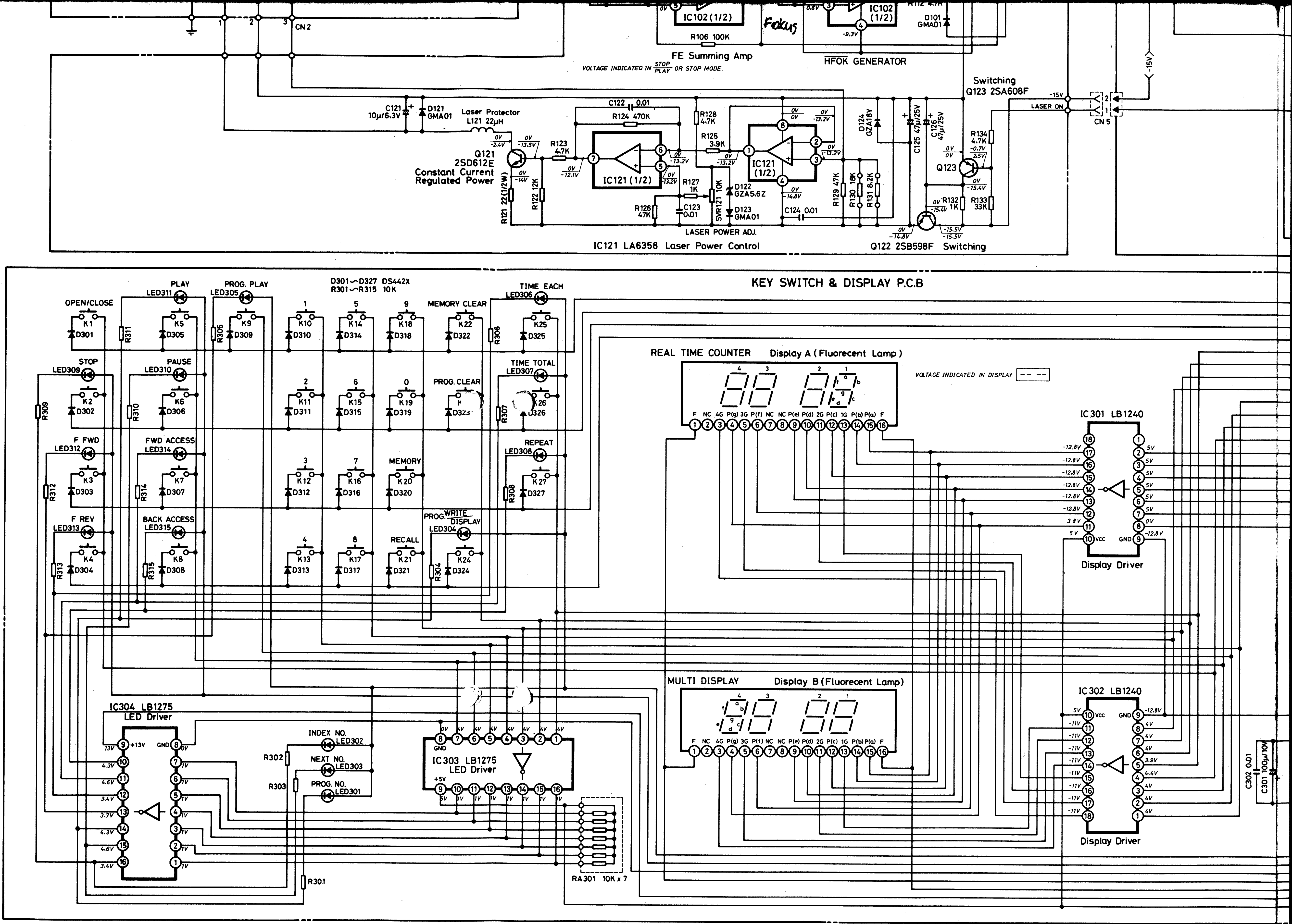
Q405
- Switching circuit for laser power control

PC-2
- Disc switch [disc set determination sensor]


From Digital Audio P.C.B
LASER ON
PAUSE
HFOK
P.HOP
N.HOP/READY
F.S/OPEN
COMP 1
COMP 2
Z-CROSS
IC201 LA9100 Servo Prossecer
HF-in
DELAY
DL-in
HOLD-P
Z-CROSS
HOLD-F
RE-in
R.PC1
R.PC2
HFOK
P.HOP
N.HOP/READY
F.S/OPEN
FE-in
F.PC1
F.PC2
Limit Amp
Pulse Generator
Sample Hold
Comparator
Summing Amp
Limit Detect
Logic
Hop Pulse
LPF
SW 1
SW 2
Z.DET
RE Out
R.NF
R.DRIVE
LIMIT
LPF
F.NF
F.DRIVE
F.SIG
+VSS
GND
-VSS
+VCC
-VCC
C203 33P
C204 120P
C205 120P
C206 0.01
R202 1.8K
R204 2.2K
R203 47K
C207 0.0068
R206 2.7K
R205 56K
C225 0.001
C208 0.47μ/50V
R208 39K
R209 1K
R211 33K
R210 82K
C226 470P
C212 0.01
C210 0.022
C211 0.0047
R213 2.2K
FOCUS OFFSET ADJ
SVR201 10K
R212 100K
R261 3.3K
R214 820
R215 10K
TP 4
C213 0.022
R216 470
C214 0.047
SVR202 33K
RADIAL GAIN ADJ.
R217 27K
R225 39K
C215
R218 82K
0.15
TP 11
R219 3.3K
R220 270
C216 10μ NP
C227 4.7μ NP
R226 47K
R236 5.6K
C222 1μ NP
TP 12
R228 8.2K
R238 2.7K
R229 3.3K
R230 270
C224 0.01
R227 1K
R239 3.9K
SVR203 10K
FOCUS GAIN ADJ
C217 47μ/16V
C219 47μ/16V
C218 0.01
C220 0.01
C275 47μ/16V
C277 47μ/16V
C276 0.01
C278 0.01
COMPARAT LEVEL ADJ
SVR281 10K
C262 0.01
C283 0.1
IC281 LA6458D
Q201 2SD438E
Q202 2SB560E
Q203 2SD613E
Q204 2SB633E
Q205 2SD438E
Q206 2SB560E
Q207 2SD613E
Q208 2SB633E
R221 2.2K
R222 2.2K
R223 2.2 (1/2W)
R224 2.2 (1/2W)
R231 2.2K
R232 2.2K
R233 2.2 (1/2W)
R234 2.2 (1/2W)
Q205～208 Focus Coil Driver
CN 6
Q201～204 Radial Coil Driver
R250 5.6K
D241 GMA01
D242 GMA01
R251 10K
R249 5.6K
IC241 (3/4)
IC241 (4/4)
R252 10K
R248 100K
R247 1K
IC241 LA6324 Radial Comparator
R241 56K
C241 0.47μ/50V N.P
R243 27K
R242 56K
C243 0.47μ/50V N.P
C242 1μ/25V N.P
R245 120K
C246 0.47μ/50V
IC241 (1/4)
IC241 (2/4)
R244 12K
R246 39K
C244 1μ/50V N.P
C245 0.47μ/50V N.P
TP 8
C231 100μ/16V
C232 100μ/16V
S-G
+13V
-13V
+9V
-15V
-9V
CN 25
CN 24
FROM POWER SUPPLY P.C.B.


IC261 LA9010 Equalizer & Comparator
Buffer
Summing Amp
Comparator
Auto Slice Level Controller
HF-in
D0
D1
D2
Comp in
RATIO ADJ
EQ Out
ENV
RESET
DSV
OFF SET
DIGITAL GND
+Vcc
GND
-Vcc
L261 D.L
L262 D.L
R261 3.3K
R262 1K
R263 1K
R264 1K
R265 1K
R273 1K
C262 33P
C263 0.033
SVR261 10K
R266 1.2K
R267 1K
R268 1K
C264 120P
C269 2.2μ/50V
C270 0.01
C271 0.033
C272 4.7μ/35V
N.P
R270 100
R272 10K
C273 0.022
R271 56
C274 0.1
C266 0.01
C265 56P
R269 4.7K
Q261 2SC930E Filter
TP 5
IC281 LA6458D
CLV Servo Controller (AFC)
C283 0.1
R284 56K
C286 47μ/16V
R285 33K
C285 1μ/50V
R286 10K
C284 0.0082
R281 180K
R282 12K
R283 12K
C281 0.012
C282 0.056
C287 47μ/16V
R289 1K
D281 GMA01
Q281 2SD600E SPINDLE MOTOR Driver
Q282 2SB631E SPINDLE MOTOR Driver
L281 100μH
R287 10K
C288 47μ/16V
0.5V/DIV 0.5μSEC/DIV
1V/DIV 0.5μSEC/DIV
R291 120 (1W)
POWER SW LAMP
SPINDLE MOTOR
DC 3.5V
CN 12
EFM
D-G
FROM DIGITAL AUDIO P.C.B
CN 7
SYSTEM CONTROL P.C.B
CN 11
Key 3
Key 2
Key 1
Key 0
SC 0
SC 1
SC 2
SC 3
SC 4
SC 5
SC 6
SC 7
LED 2
LED 1
S-G
AC 1
+13V
+5V
-15V
CN 10
IC401 LM6402H-192
SYSTEM CONTROL Microcomputer
POAT A
POAT B
POAT C
POAT D
POAT E
POAT F
POAT G
POAT H
POAT I
I/O Buffer
RAM 128 x 4bit
ROM 2048 x 8 bit
DP COUNTER
PC
AC
ALU
PLA
STACK 1
STACK 2
STACK 3
STACK 4
TIMER COUNTER
Interrupt
PLA : Program Logic Array
AC : Accumulator
DP : Data Point
ALU : Arithmetic Logic Unit
C : Carry FF
C' : Carry Sidetrack FF
PC : Program Counter
SCAN 0
SCAN 1
SCAN 2
SCAN 3
SCAN 4
SCAN 5
SCAN 6
SCAN 7
SEG a
SEG b
SEG c
SEG d
SEG e
SEG f
SEG g
PO
RESET
INT
SCK
SI
SO
NC
LMCLS
LMOPN
LED
FS
LSMT
HFOK
CLVOK
DISC
COPN
CCLS
PSHD
Vss
TEST
XTAL
EXTAL
VDD
C401 220P
X401 800Hz
R401 1M
C402 220P
C422 100μ/10V
L401 10μH
2V/DIV 0.5μSEC/DIV
RA401 10K x 7
RA402 10K x 6
RA403 10K x 4
C403 0.01
C404 0.01
C405 0.01
C406 0.01
CN 9
TO DIGITAL AUDIO P.C.B
LASER ON
R403 10K
R402 10K
D400 DS442X
C400 47μ/10V
R404 330
C421 100P
C407 0.01
C408 0.01
C409 0.01
C410 0.01
DISC SW P.C.B
PHOTO INTERRUPT PC 2
DISC-LED
CN 14
S401 OPEN
S402 CLOSE
S403 PUSH
Loading Switch (Mechanism)
IC402 BA6109 LOADING MOTOR Driver
R420 10 (1/2W)
R421 10 (1/2W)
R422 10 (1/2W)
Vcc 1
Vcc 2
Rin
Fin
Logic
Pre
Driver
VZ 1
Vout 1
Vout 2
VZ 2
GND
VR
R423 330
C412 0.022
C411 0.012
LOADING MOTOR
DC 9V
LM-
LM+
CN13
Q401, 403 2SC536G LED Driver
Q402, 404 2SD734F LED Driver
Q406, 407, 408 2SC536G Initialize Reset
R407 3.9K
R406 10K
R409 3.9K
R408 10K
R412 10K
R415 27K
D402 GZA3.3Y
R414 100
R413 10K
C413 33μ/16V
D403 DS442X
R416 15K
R417 5.6K
R419 100K
C414 2.2μ /50V
C415 100μ/10V
C416 0.01
C419 47μ/25V
C420 0.01
C417 47μ/25V
C418 0.01
D401 GZA5.1Y
R418 10K
R411 2.2K
R410 10K
Q405 2SA608F Switching (Laser)
CN 23
FROM POWER SUPPLY P.C.B
AC 2
+13V
+5V
D-G
S-G
-15V
C301 100μ/10V

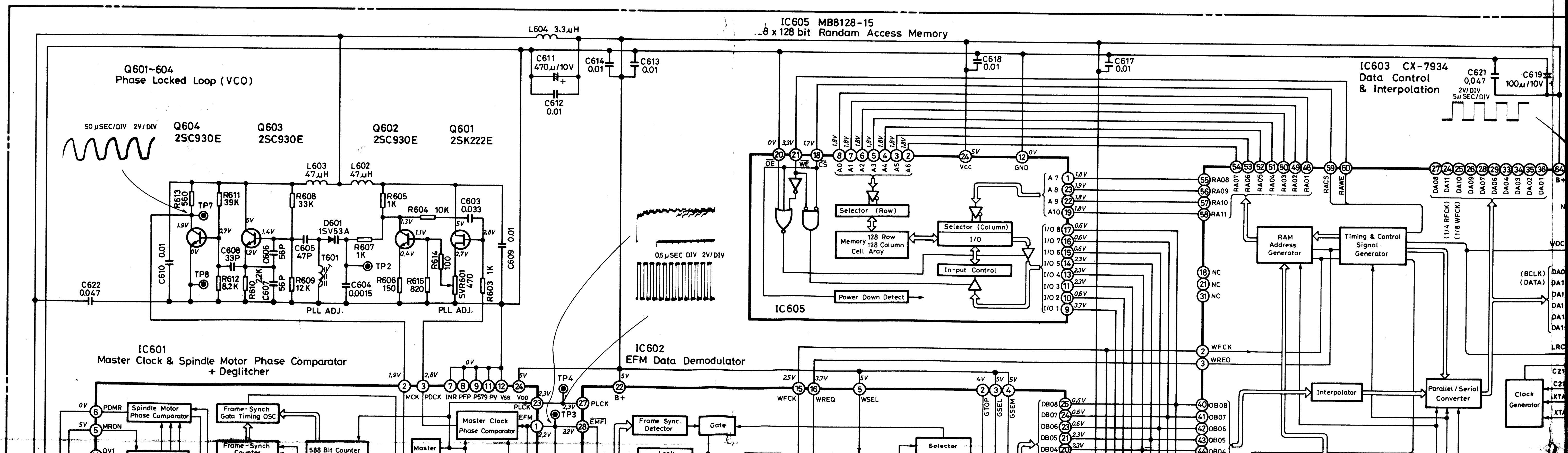

IC102 (1/2)
R106 100K
Fokus
FE Summing Amp
VOLTAGE INDICATED IN STOP/PLAY OR STOP MODE.
HFOK GENERATOR
D101 GMA01
Switching Q123 2SA608F
-15V
LASER ON
CN5
C122 0.01
R124 470K
R128 4.7K
R125 3.9K
R123 4.7K
IC121 (1/2)
R127 1K
R126 47K
C123 0.01
SVR121 10K
D122 GZA5.6Z
D123 GMA01
C124 0.01
R129 47K
R130 18K
R131 8.2K
D124 GZA18Y
C125 47µ/25V
C126 47µ/25V
R134 4.7K
Q123
R132 1K
R133 33K
R122 12K
LASER POWER ADJ.
IC121 LA6358 Laser Power Control
Q122 2SB598F Switching
R261 3.3K
R262 1K
R263 1K
L261 D.L
L262 D.L
C262 33P
R264 1K
R265 1K
R273 1K
C263 0.033
HF-in
D0
D1
D2
Comp in
Buffer
Summing Amp
Comparator
Auto Slice Level Controller
+Vcc
GND
-Vcc
RATIO ADJ
EQ Out
ENV
RESET
DSV
OFF SET
DIGITAL GND
IC261 LA9010 Equalizer & Comparator
SVR261 10K
C268 4.7µ/25V
R266 1.2K
R267 1K
R268 1K
C264 120P
C269 2.2µ/50V
C270 0.01
C271 0.033
N.P
C272 4.7µ/35V
R270 100
R272 10K
C273 0.022
R271 56
C274 0.1
C266 0.01
C265 56P
R269 4.7K
TP 5
Q261 2SC930E Filter
R285 33K
C285 1µ/50V
R286 10K
C284 0.0082
R281 180K
R282 12K
C281 0.012
R284
KEY SWITCH & DISPLAY P.C.B
TIME EACH
LED306
K25
D325
TIME TOTAL
LED307
K26
D326
REPEAT
LED308
K27
D327
R306
REAL TIME COUNTER
Display A (Fluorecent Lamp)
VOLTAGE INDICATED IN DISPLAY
F NC 4G P(g) 3G P(f) NC NC P(e) P(d) 2G P(c) 1G P(b) P(a) F
IC301 LB1240
Display Driver
MULTI DISPLAY
Display B (Fluorecent Lamp)
IC302 LB1240
Display Driver
C302 0.01
C301 100µ/10V
RA301 10K x 7
CN11
CN10
Key 3
Key 2
Key 1
Key 0
SC0
SC1
SC2
SC3
SC4
SC5
SC6
SC7
LED2
LED1
S-G
AC1
+13V
+5V
-15V
SYSTEM CONTROL P.C.B
SCAN 0
SCAN 1
SCAN 2
SCAN 3
SCAN 4
SCAN 5
SCAN 6
SCAN 7
SEG a
SEG b
SEG c
SEG d
SEG e
SEG f
SEG g
PO
POAT A
POAT B
POAT C
POAT D
POAT E
POAT F
POAT G
POAT H
POAT I
I/O Buffer
PLA
RAM 128 x 4 bit
DP COUNTER
ROM 2048 x 8 bit
PC
AC
ALU
STACK 1
STACK 2
STACK 3
STACK 4
TIMER COUNTER
Interrupt
PLA : Program Logic Arrey
AC : Accumulator
DP : Data Point
ALU : Arithmetic Logic Unit
C : Carry FF
C' : Carry Sidetrack FF
PC : Program Counter
IC401 LM6402H-192
SYSTEM CONTROL Microcomputer
VSS
TEST
XTAL
EXTAL
VDD
C401 220P
C402 220P
X401 800Hz
R401 1M
C422 100µ/10V
2V/DIV 0.5µSEC/DIV
L401 10µH
RA401 10K x 7
Q401, 403 2SC536G LED Driver
Q402, 404 2SD734F LED Driver
Q406, 407, 408 2SC536G Initialize Reset
R407 3.9K
R406 10K
R409 3.9K
R408 10K
Q401
Q402
Q403
Q404
Q406
Q407
Q408
R412 10K
R413 10K
D402 GZA3.3Y
R414 100
C413 33µ/16V
R415 27K
R419 100K
D403 DS442X
R416 15K
R417 5.6K
C414 2.2µ/50V
C415 100µ/10V
C416 0.01
R418 10K
IC402 BA6109 LOADING MOTOR Driver
R420 10 (1/2W)
R421 10 (1/2W)
R422 10 (1/2W)
Vcc1
Vcc2
Rin
Fin
Logic
Pre
Driver
GND
R423 330
D401 GZA5
C419 47µ/25V
C420 0.01
C417 47µ/25V
C418 0.01
+13V
+5V
S-G
-15V


CN2
IC102 (1/2)
R106 100K
Fokus
FE Summing Amp
VOLTAGE INDICATED IN STOP/PLAY OR STOP MODE.
IC102 (1/2)
D101 GMA01
HFOK GENERATOR
Switching
Q123 2SA608F
-15V
LASER ON
CN5
(-15V)
C121 10µ/6.3V
D121 GMA01
Laser Protector
L121 22µH
Q121 2SD612E
Constant Current Regulated Power
R121 22(1/2W)
R122 12K
R123 4.7K
C122 0.01
R124 470K
IC121 (1/2)
R128 4.7K
R125 3.9K
R127 1K
SVR121 10K
D122 GZA5.6Z
D123 GMA01
R126 47K
C123 0.01
C124 0.01
LASER POWER ADJ.
IC121 LA6358 Laser Power Control
R129 47K
R130 18K
R131 8.2K
D124 GZA18Y
C125 47µ/25V
C126 47µ/25V
R134 4.7K
R132 1K
R133 33K
Q123
Q122 2SB598F Switching
KEY SWITCH & DISPLAY P.C.B
D301~D327 DS442X
R301~R315 10K
OPEN/CLOSE
PLAY
PROG. PLAY
MEMORY CLEAR
TIME EACH
STOP
PAUSE
PROG. CLEAR
TIME TOTAL
F FWD
FWD ACCESS
MEMORY
REPEAT
F REV
BACK ACCESS
PROG. WRITE/DISPLAY
RECALL
1 2 3 4 5 6 7 8 9 0
REAL TIME COUNTER
Display A (Fluorecent Lamp)
VOLTAGE INDICATED IN DISPLAY
F NC 4G P(g) 3G P(f) NC NC P(e) P(d) 2G P(c) 1G P(b) P(a) F
IC301 LB1240
Display Driver
MULTI DISPLAY
Display B (Fluorecent Lamp)
IC302 LB1240
Display Driver
C302 0.01
C301 100µ/10V
IC304 LB1275
LED Driver
INDEX NO.
NEXT NO.
PROG. NO.
R302
R303
R301
IC303 LB1275
LED Driver
RA301 10K x 7

SCHEMATIC DIAGRAM ①(DIGITAL/AUDIO/POWER SUPPLY)

FUNCTIONS OF PRINCIPAL PARTS

Q601～604	■ Spindle motor servo (CLV = constant linear velocity) circuit [master clock generation in the PLL circuit, VCO (Voltage control oscilator), LPF (low-pass filter) section]
IC601	■ Spindle motor servo circuit [phase compartor for the master clock in the PLL circuit, phase comparator for the spindle motor, detect of the frame sync signal from the EFM signal, speed control by means of access or memory control] ■ Deglitcher circuit (used in old-type circuits only) [L&R channel separation signal generation circuit]
PC-1	■ Limit switch [lead-in position sensor]
IC608·609	■ EFM signal gate [wave formation of HF OK and RFCK]
Q501·502	■ Control of the stepping motor drive assembly
Q551～555	■ Stepping motor driver
IC502	■ One-shot circit [for pause operation]
IC605	■ Random access memory [CIRC (Cross interleave Reed-solomon code) de-interleave and error buffer, rotational jitter absorption for spindle motor, digital audio signal output circuit for clock (X601) syncronization.]
IC602	■ EFM data demodulation [detect, protection, and insertion of the frame signal, EFM signal demodulation, separation of subcode signal]
Q511～515	■ Muting circuit [mutes the control signal input to IC603]
IC503	■ Stepping motor driver
IC603	■ Data procesi [generates D/A conv ■ Interpolation [compensa correction
IC604	■ Error correcti
IC501 (microcomputer)	■ Subcode analy ■ Pick-up contr [Stepping control si control ci ■ Audio circuit [muting, emphasis
IC504	■ Pause operati



IC605 MB8128-15
8 x 128 bit Randam Access Memory
L604 3.3μH
C611 470μ/10V
C612 0.01
C614 0.01
C613 0.01
C618 0.01
C617 0.01
Q601~604
Phase Locked Loop (VCO)
50μSEC/DIV 2V/DIV
Q604 2SC930E
Q603 2SC930E
Q602 2SC930E
Q601 2SK222E
L603 47μH
L602 47μH
R613 560
R611 39K
R608 33K
D601 1SV53A
R605 1K
R604 10K
C603 0.033
TP7
TP8
C608 33P
C606 56P
C605 47P
T601
R607 1K
TP2
R614 100
SVR601 470
R603 1K
C609 0.01
C610 0.01
R612 8.2K
R610 2.2K
C607 56P
R609 12K
C604 0.0015
R606 150
R615 820
PLL ADJ.
PLL ADJ.
C622 0.047
0.5μSEC DIV 2V/DIV
Selector (Row)
Memory 128 Row 128 Column Cell Aray
Selector (Column)
I/O
In-put Control
Power Down Detect
IC605
IC603 CX-7934
Data Control & Interpolation
C621 0.047
C619 100μ/10V
2V/DIV 5μSEC/DIV
RAM Address Generator
Timing & Control Signal Generator
(1/4 RFCK)
(1/8 WFCK)
(BCLK)
(DATA)
IC601
Master Clock & Spindle Motor Phase Comparator + Deglitcher
IC602
EFM Data Demodulator
TP4
TP3
WFCK
WREQ
PDMR
Spindle Motor Phase Comparator
Frame-Synch Gata Timing OSC
MRON
Frame-Synch Counter
588 Bit Counter
Master
Master Clock Phase Comparator
MCK
PDCK
PLCK
EFM
EMFI
Frame Sync. Detector
Gate
WSEL
GTOP
GSEL
GSEM
Selector
Interpolator
Parallel / Serial Converter
Clock Generator

ER SUPPLY)

Random access memory
[CIRC (Cross interleave Reed-solomon code) de-interleave and error buffer, rotational jitter absorption for spindle motor, digital audio signal output circuit for clock (X601) syncronization.]

EFM data demodulation
[detect, protection, and insertion of the frame signal, EFM signal demodulation, separation of subcode signal]

Muting circuit [mutes the control signal input to IC603]

Stepping motor driver

IC603
- ■ Data processing contol
  [generates control signal and address for RAM, interface circuit for D/A convertor]
- ■ Interpolation
  [compensates the data signal at a sequenctial average level when error correction is not possible with the CIRC]

IC604
- ■ Error correction [CIRC error correction circuit]

IC501 (microcomputer)
- ■ Subcode analysis [subcode signal read out]
- ■ Pick-up control
  [Stepping motor drive, tracking control during play, IC601 speed control signal generation, sending/receiveing of data to/from system control circuit]
- ■ Audio circuit control
  [muting, ATTM (12 dB damping command to D/A convertor), emphasis command]

IC504
- ■ Pause operation gate [$\overline{\text{FS}}$/OPEN wave shaping]

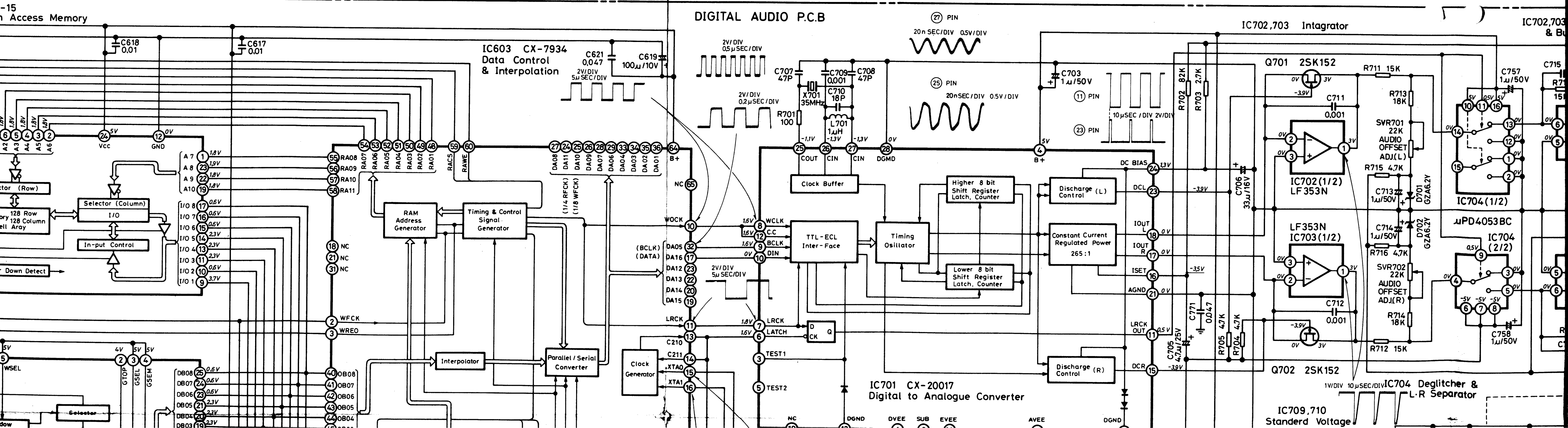
IC701
- ■ D/A (digital-analog) conversion circuit
  [TTL→ECL conversion, colock buffer, timing pu superior 8 bit and inferior 8 bit register, rated discharge control circuit, left and right channel sep circuit

IC702·703 ($\frac{1}{2}$)
- ■ D/A conversion circuit [inte

Q701·702
- ■ D/A conversion circuit
  discharge circuit (switching circuit for discharge c

IC709·710
- ■ Rated voltage stabilizing circuit

))



-15
Access Memory
C618 0,01
C617 0,01
Vcc
GND
Selector (Column)
I/O
In-put Control
Down Detect
128 Row 128 Column Cell Array
WSEL
Selector
IC603 CX-7934
Data Control & Interpolation
C621 0,047
C619 100μ/10V
2V/DIV 5μSEC/DIV
RAM Address Generator
Timing & Control Signal Generator
Interpolator
Parallel / Serial Converter
Clock Generator
(1/4 RFCK)
(1/8 WFCK)
WFCK
WREO
NC
WOCK
(BCLK)
(DATA)
LRCK
C210
C211
XTAO
XTAI
DIGITAL AUDIO P.C.B
2V/DIV 0,5μSEC/DIV
2V/DIV 0,2μSEC/DIV
C707 47P
C709 0,001
C708 47P
X701 35MHz
C710 18P
L701 1μH
R701 100
Clock Buffer
TTL-ECL Inter-Face
Timing Osillator
Higher 8 bit Shift Register Latch, Counter
Lower 8 bit Shift Register Latch, Counter
WCLK
C.C
BCLK
DIN
LATCH
TEST1
TEST2
COUT
CIN
DGMD
27 PIN
20n SEC/DIV 0,5V/DIV
25 PIN
20nSEC/DIV 0,5V/DIV
C703 1μ/50V
11 PIN
23 PIN
10μSEC/DIV 2V/DIV
IC701 CX-20017
Digital to Analogue Converter
Discharge Control (L)
Discharge Control (R)
Constant Current Regulated Power 265:1
DC BIAS
DCL
DCR
IOUT L
IOUT R
ISET
AGND
LRCK OUT
R702 82K
R703 2,7K
C706 33μ/16V
C771 0,047
C705 4,7μ/25V
R705 4,7K
R704 4,7K
IC702,703 Intagrator
Q701 2SK152
Q702 2SK152
R711 15K
R712 15K
R713 18K
R714 18K
C711 0,001
C712 0,001
IC702(1/2) LF353N
LF353N IC703(1/2)
SVR701 22K AUDIO OFFSET ADJ(L)
SVR702 22K AUDIO OFFSET ADJ(R)
R715 4,7K
R716 4,7K
C713 1μ/50V
C714 1μ/50V
D701 GZA6.2Y
D702 GZA6.2Y
C757 1μ/50V
C758 1μ/50V
IC704(1/2)
μPD4053BC
IC704 (2/2)
IC704 Deglitcher & L·R Separator
1V/DIV 10μSEC/DIV
IC709,710 Standerd Voltage
IC702,703 & B
C715
DGND
DVEE
SUB
EVEE
AVEE

sing contol
s control signal and address for RAM, interface circuit for
vertor

n
sates the data signal at a sequenctial average level when error
on is not possible with the CIRC

tion [CIRC error correction circuit]

lysis [subcode signal read out]

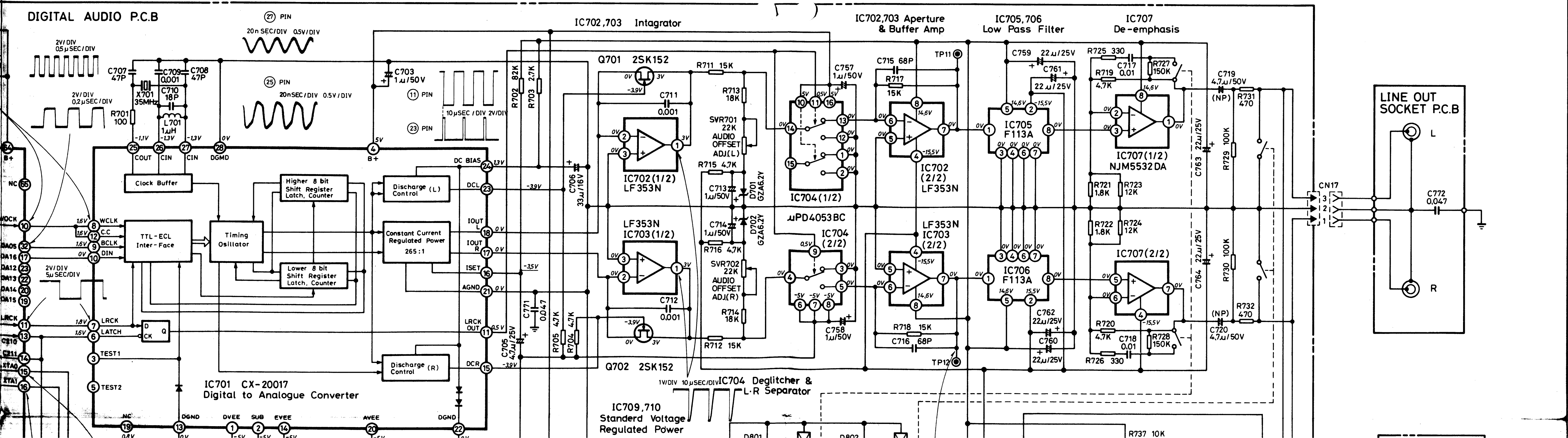
trol
g motor drive, tracking control during play, IC601 speed
signal generation, sending/receiveing of data to/from system
circuit

t control
ATTM (12 dB damping command to D/A convertor),
s command

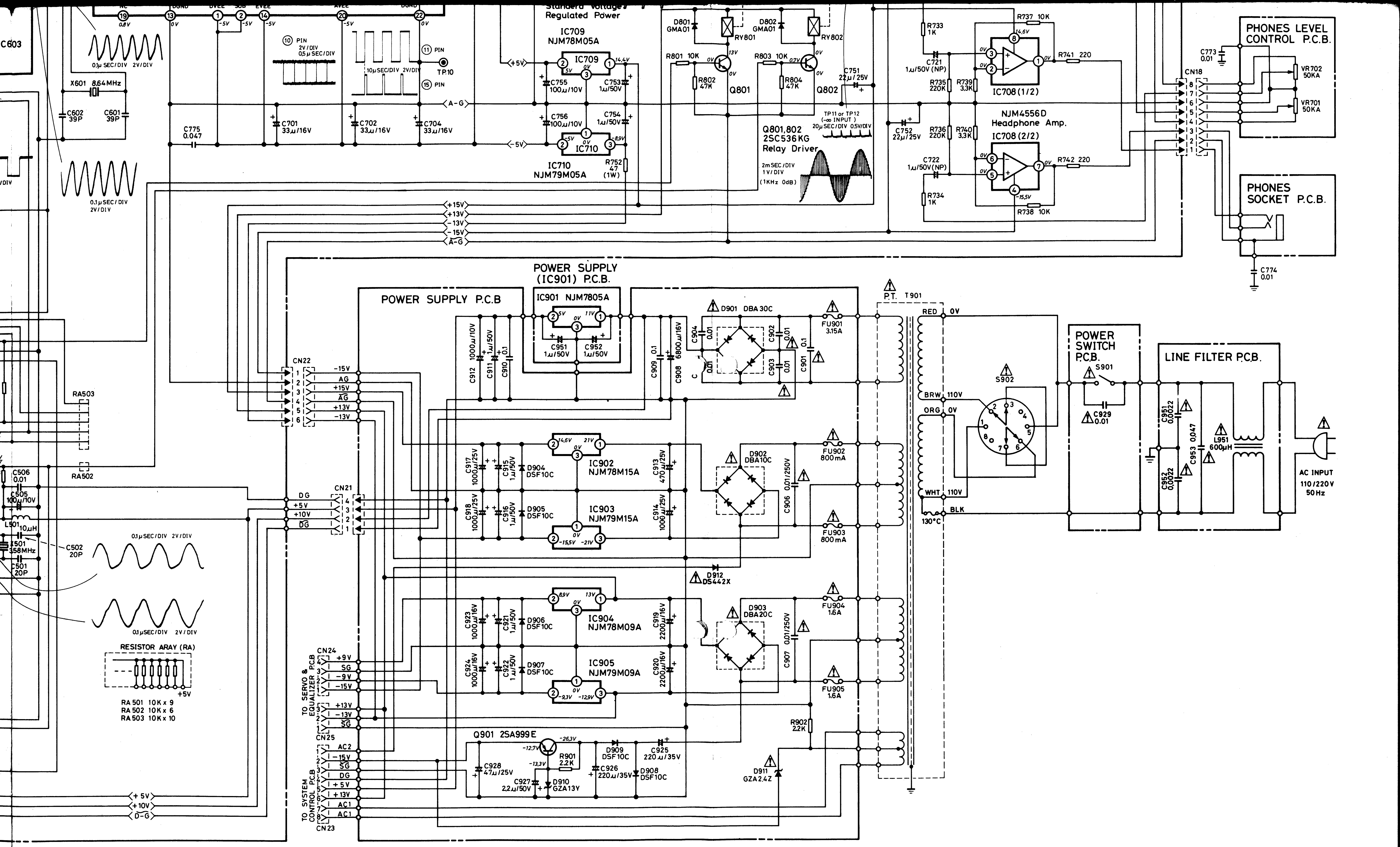
tion gate [$\overline{\text{FS}}$/OPEN wave shaping]

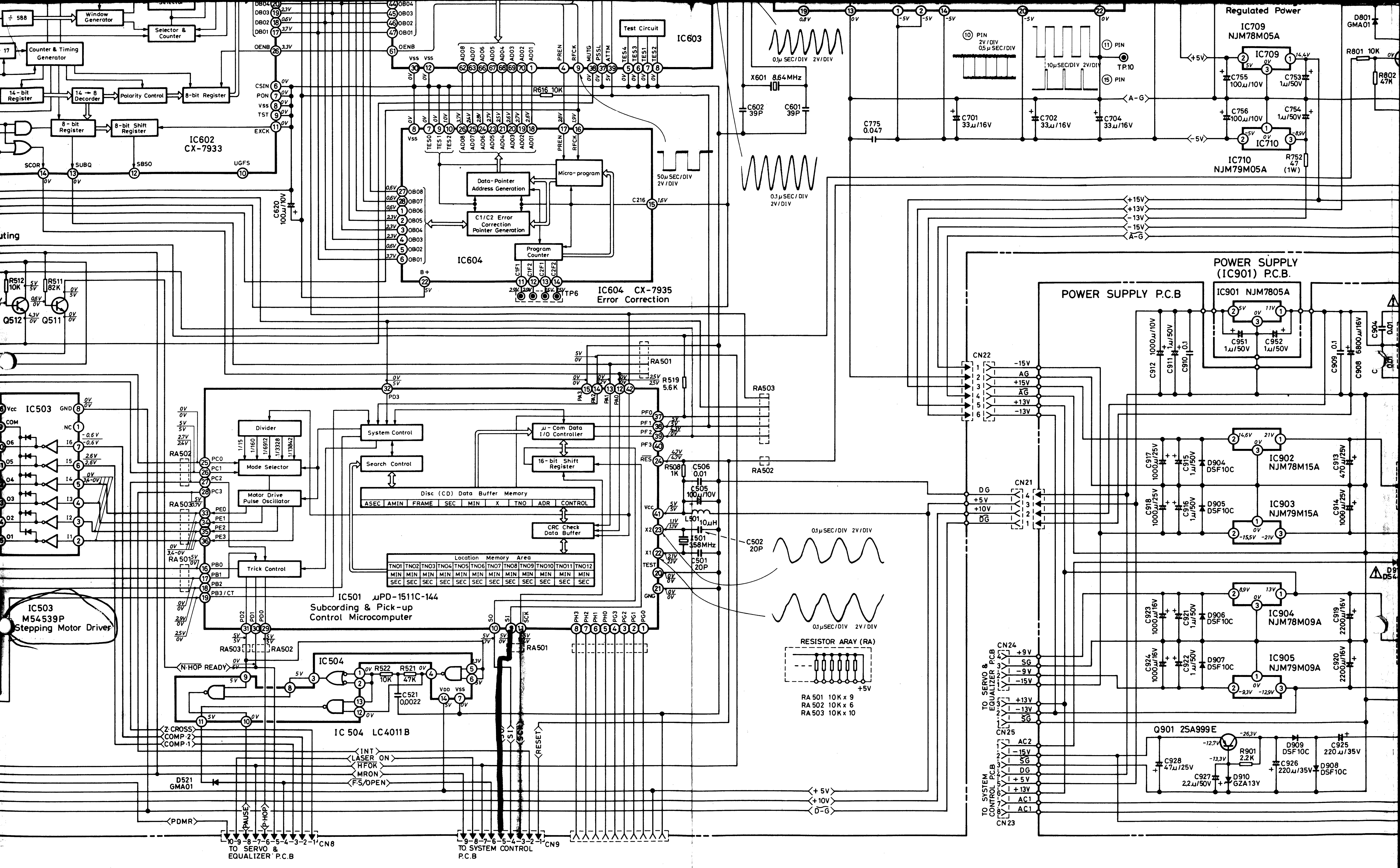
IC701	■ D/A (digital-analog) conversion circuit [TTL→ECL conversion, colock buffer, timing pulse generation, superior 8 bit and inferior 8 bit register, rated current supply, discharge control circuit, left and right channel separation control circuit]
IC702·703 ($\frac{1}{2}$)	■ D/A conversion circuit [integration circuit]
Q701·702	■ D/A conversion circuit discharge circuit (switching circuit for discharge of C711, C712)
IC709·710	■ Rated voltage stabilizing circuit

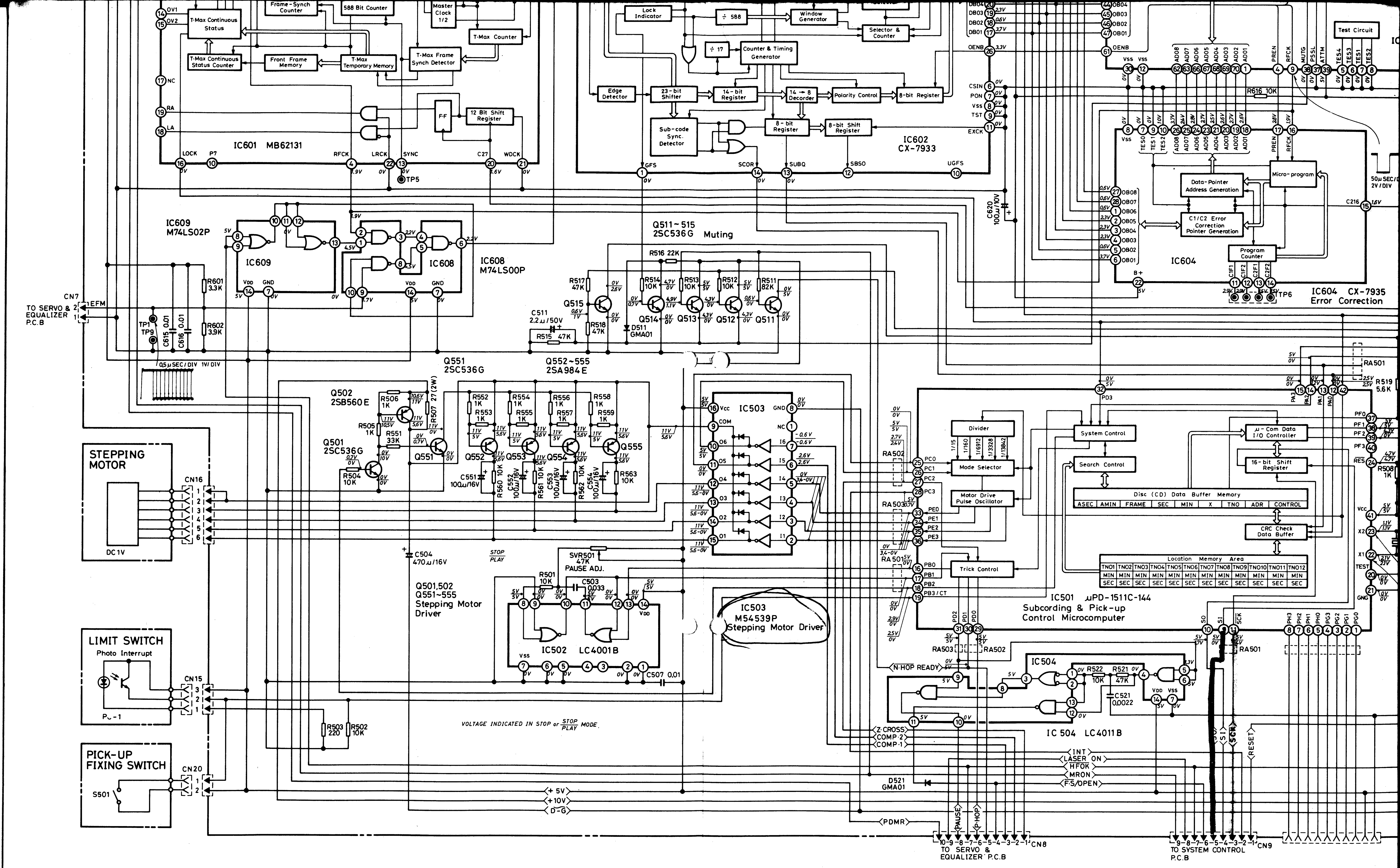
IC704	■ Deglitcher circuit [including left/right channel separation]
IC702·703 ($\frac{2}{2}$)	■ Aperture circuit [including buffer amp]
IC801·802	■ Relayed river
IC705·706	■ Low-pass filter [LPF]
IC707	■ De-emphasis
IC708	■ Headphone amplifier
RY801·Q801	■ For de-emphasis
RY802·Q802	■ For muting
IC901～905	■ Rated voltage stabilizing power source
Q901	■ Rated voltage stabilizing power source



DIGITAL AUDIO P.C.B
IC702,703 Intagrator
IC702,703 Aperture & Buffer Amp
IC705,706 Low Pass Filter
IC707 De-emphasis
LINE OUT SOCKET P.C.B
L
R
CN17
Q701 2SK152
Q702 2SK152
IC702(1/2) LF353N
LF353N IC703(1/2)
IC704(1/2)
μPD4053BC
IC704(2/2)
IC702 (2/2) LF353N
LF353N IC703 (2/2)
IC705 F113A
IC706 F113A
IC707(1/2) NJM5532DA
IC707(2/2)
Clock Buffer
TTL-ECL Inter-Face
Timing Oscillator
Higher 8 bit Shift Register Latch, Counter
Lower 8 bit Shift Register Latch, Counter
Discharge Control (L)
Discharge Control (R)
Constant Current Regulated Power 265:1
IC701 CX-20017 Digital to Analogue Converter
IC704 Deglitcher & L·R Separator
IC709,710 Standerd Voltage Regulated Power
SVR701 22K AUDIO OFFSET ADJ(L)
SVR702 22K AUDIO OFFSET ADJ(R)
TP11
TP12
X701 35MHz
L701 1μH

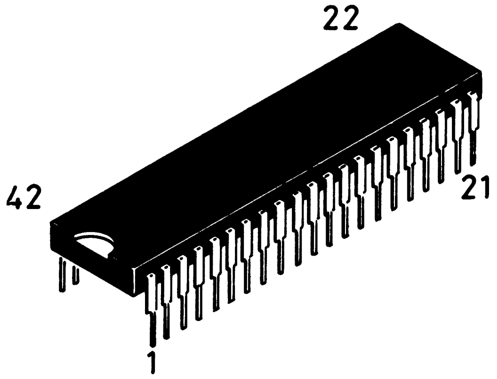

Standard Voltage Regulated Power
IC709 NJM78M05A
IC710 NJM79M05A
C755 100µ/10V
C753 1µ/50V
C756 100µ/10V
C754 1µ/50V
R752 47 (1W)
C701 33µ/16V
C702 33µ/16V
C704 33µ/16V
C775 0.047
X601 8.64MHz
C602 39P
C601 39P
C603
⑩ PIN 2V/DIV 0.5µSEC/DIV
⑪ PIN
TP.10
⑮ PIN
10µSEC/DIV 2V/DIV
0.1µSEC/DIV 2V/DIV
D801 GMA01
D802 GMA01
RY801
RY802
R801 10K
R802 47K
R803 10K
R804 47K
Q801
Q802
C751 22µ/25V
Q801,802 2SC536KG Relay Driver
TP11 or TP12 (-∞ INPUT) 20µSEC/DIV 0.5V/DIV
2mSEC/DIV 1V/DIV (1KHz 0dB)
R733 1K
R734 1K
C721 1µ/50V(NP)
C722 1µ/50V(NP)
C752 22µ/25V
R735 220K
R736 220K
R739 3.3K
R740 3.3K
R737 10K
R738 10K
R741 220
R742 220
IC708(1/2)
IC708(2/2)
NJM4556D Headphone Amp.
C773 0.01
CN18
PHONES LEVEL CONTROL P.C.B.
VR702 50KA
VR701 50KA
PHONES SOCKET P.C.B.
C774 0.01
+15V
+13V
-13V
-15V
A-G
+5V
-5V
POWER SUPPLY P.C.B
POWER SUPPLY (IC901) P.C.B.
IC901 NJM7805A
C951 1µ/50V
C952 1µ/50V
C912 1000µ/10V
C911 1µ/50V
C910 0.1
C909 0.1
C908 6800µ/16V
C904 0.01
C902 0.01
C903 0.01
C901 0.1
D901 DBA30C
FU901 3.15A
CN22
-15V
AG
+15V
AG
+13V
-13V
IC902 NJM78M15A
IC903 NJM79M15A
C917 1000µ/25V
C915 1µ/50V
D904 DSF10C
C918 1000µ/25V
C916 1µ/50V
D905 DSF10C
C913 470µ/25V
C914 1000µ/25V
D902 DBA10C
C906 0.01/250V
FU902 800mA
FU903 800mA
D912 DS442X
IC904 NJM78M09A
IC905 NJM79M09A
C923 1000µ/16V
C921 1µ/50V
D906 DSF10C
C924 1000µ/16V
C922 1µ/50V
D907 DSF10C
C919 2200µ/16V
C920 2200µ/16V
D903 DBA20C
C907 0.01/250V
FU904 1.6A
FU905 1.6A
R902 2.2K
D911 GZA2.4Z
Q901 2SA999E
R901 2.2K
D909 DSF10C
C925 220µ/35V
C926 220µ/35V
D908 DSF10C
C928 47µ/25V
C927 2.2µ/50V
D910 GZA13Y
CN21
DG
+5V
+10V
DG
CN24
+9V
SG
-9V
-15V
+13V
-13V
SG
CN25
TO SERVO & EQUALIZER P.C.B
AC2
-15V
SG
DG
+5V
+13V
AC1
AC1
CN23
TO SYSTEM CONTROL P.C.B
P.T. T901
RED 0V
BRW 110V
ORG 0V
WHT 110V
BLK
130°C
S902
POWER SWITCH P.C.B.
S901
C929 0.01
LINE FILTER P.C.B.
C951 0.0022
C952 0.0022
C953 0.047
L951 600µH
AC INPUT 110/220V 50Hz
RA503
RA502
C506 0.01
C505 100µ/10V
L501 10µH
X501 3.58MHz
C502 20P
C501 20P
RESISTOR ARAY (RA)
RA501 10K x 9
RA502 10K x 6
RA503 10K x 10
+5V
0.1µSEC/DIV 2V/DIV


Window Generator
Selector & Counter
Counter & Timing Generator
14-bit Register
14 → 8 Decorder
Polarity Control
8-bit Register
8-bit Shift Register
IC602
CX-7933
SCOR
SUBQ
SBSO
UGFS
EXCK
CSIN
PON
TST
OENB
C620 100μ/10V
Test Circuit
IC603
IC604
IC604 CX-7935
Error Correction
Data-Pointer Address Generation
C1/C2 Error Correction Pointer Generation
Micro-program
Program Counter
TP6
R616 10K
X601 8.64MHz
C602 39P
C601 39P
C775 0.047
50μ SEC/DIV 2V/DIV
0.1μ SEC/DIV 2V/DIV
⑩ PIN 2V/DIV 0.5μ SEC/DIV
⑪ PIN
⑮ PIN
TP.10
10μ SEC/DIV 2V/DIV
C701 33μ/16V
C702 33μ/16V
C704 33μ/16V
Regulated Power
IC709 NJM78M05A
IC710 NJM79M05A
C755 100μ/10V
C753 1μ/50V
C756 100μ/10V
C754 1μ/50V
R752 47 (1W)
D801 GMA01
R801 10K
R802 47K
+15V
+13V
-13V
-15V
A-G
POWER SUPPLY (IC901) P.C.B.
POWER SUPPLY P.C.B
IC901 NJM7805A
C951 1μ/50V
C952 1μ/50V
C912 1000μ/10V
C911 1μ/50V
C910 0.1
C909 0.1
C908 6800μ/16V
C904 0.01
CN22
AG
CN21
DG
+5V
+10V
IC902 NJM78M15A
IC903 NJM79M15A
IC904 NJM78M09A
IC905 NJM79M09A
C917 1000μ/25V
C915 1μ/50V
D904 DSF10C
C913 470μ/25V
C918 1000μ/25V
C916 1μ/50V
D905 DSF10C
C914 470μ/25V
C923 1000μ/16V
C921 1μ/50V
D906 DSF10C
C919 2200μ/16V
C924 1000μ/16V
C922 1μ/50V
D907 DSF10C
C920 2200μ/16V
CN24
TO SERVO & EQUALIZER P.C.B
CN25
+9V
SG
-9V
TO SYSTEM CONTROL P.C.B
CN23
AC2
AC1
Q901 2SA999E
R901 2.2K
D909 DSF10C
C925 220μ/35V
C928 47μ/25V
C927 2.2μ/50V
D910 GZA13Y
C926 220μ/35V
D908 DSF10C
IC503
IC503 M54539P Stepping Motor Driver
R512 10K
R511 82K
Q512
Q511
RA502
RA503
RA501
RA501
R519 5.6K
Divider
System Control
Mode Selector
Search Control
Motor Drive Pulse Oscillator
Trick Control
μ-Com Data I/O Controller
16-bit Shift Register
Disc (CD) Data Buffer Memory
ASEC AMIN FRAME SEC MIN X TNO ADR CONTROL
CRC Check Data Buffer
Location Memory Area
IC501 μPD-1511C-144
Subcording & Pick-up Control Microcomputer
R508 1K
C506 0.01
C505 100μ/10V
L501 10μH
X501 4.58MHz
C502 20P
C501 20P
0.1μ SEC/DIV 2V/DIV
RESISTOR ARAY (RA)
RA 501 10K x 9
RA 502 10K x 6
RA 503 10K x 10
IC504
IC 504 LC4011B
R522 10K
R521 47K
C521 0.0022
N-HOP READY
Z-CROSS
COMP-2
COMP-1
INT
LASER ON
HFOK
MRON
F-S/OPEN
D521 GMA01
PDMR
PAUSE
P-HOP
SO
SI
SCK
RESET
+5V
+10V
D-G
CN8
TO SERVO & EQUALIZER P.C.B
CN9
TO SYSTEM CONTROL P.C.B

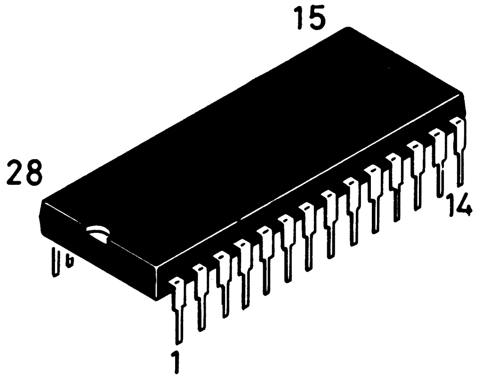

IC601 MB62131
T-Max Continuous Status
T-Max Continuous Status Counter
Frame-Synch Counter
588 Bit Counter
Master Clock 1/2
T-Max Counter
T-Max Frame Synch Detector
Front Frame Memory
T-Max Temporary Memory
F-F
12 Bit Shift Register
OV1
OV2
NC
RA
LA
LOCK
P7
RFCK
LRCK
SYNC
C27
WDCK
TP5
IC602 CX-7933
Lock Indicator
÷ 588
÷ 17
Window Generator
Selector & Counter
Counter & Timing Generator
Edge Detector
23-bit Shifter
14-bit Register
14 → 8 Decorder
Polarity Control
8-bit Register
Sub-code Sync. Detector
8-bit Register
8-bit Shift Register
GFS
SCOR
SUBQ
SBSO
UGFS
DB04
DB03
DB02
DB01
OENB
CSIN
PON
Vss
TST
EXCK
C620 100µ/10V
IC604 CX-7935 Error Correction
Test Circuit
Data-Pointer Address Generation
Micro-program
C1/C2 Error Correction Pointer Generation
Program Counter
R616 10K
PREN
RFCK
MUTG
PSSL
ATTM
TES4
TES3
TES1
TES2
TES0
AD08
AD07
AD06
AD05
AD04
AD03
AD02
AD01
OB08
OB07
OB06
OB05
OB04
OB03
OB02
OB01
C1F1
C1F2
C2F1
C2F2
TP6
C216
50µSEC/DIV 2V/DIV
IC609 M74LS02P
IC608 M74LS00P
CN7
EFM
TO SERVO & EQUALIZER P.C.B
TP1
TP9
C615 0.01
C616 0.01
R601 3.3K
R602 3.9K
0.5µSEC/DIV 1V/DIV
Q511~515 2SC536G Muting
R516 22K
R514 10K
R513 10K
R512 10K
R511 82K
R517 47K
R518 47K
Q515
Q514
Q513
Q512
Q511
D511 GMA01
C511 2.2µ/50V
R515 47K
Q551 2SC536G
Q552~555 2SA984E
Q502 2SB560E
Q501 2SC536G
R506 1K
R505 1K
R551 33K
R507 27 (2W)
R504 10K
R552 1K
R553 1K
R554 1K
R555 1K
R556 1K
R557 1K
R558 1K
R559 1K
C551 100µ/16V
C552 100µ/16V
C553 100µ/16V
C554 100µ/16V
R560 10K
R561 10K
R562 10K
R563 10K
Q551
Q552
Q553
Q554
Q555
C504 470µ/16V
STOP/PLAY
IC503
Vcc
GND
COM
NC
O1
O2
O3
O4
O5
O6
I1
I2
I3
I4
I5
I6
SVR501 47K PAUSE ADJ.
R501 10K
C503 0.033
C507 0.01
Q501,502 Q551~555 Stepping Motor Driver
IC502 LC4001B
IC503 M54539P Stepping Motor Driver
VOLTAGE INDICATED IN STOP or STOP/PLAY MODE.
STEPPING MOTOR
DC 1V
CN16
LIMIT SWITCH
Photo Interrupt
P⌣-1
CN15
R503 220
R502 10K
PICK-UP FIXING SWITCH
S501
CN20
+5V
+10V
D-G
PDMR
IC501 µPD-1511C-144 Subcording & Pick-up Control Microcomputer
Divider
1/15
1/160
1/6912
1/3328
1/13842
Mode Selector
Motor Drive Pulse Oscillator
Trick Control
System Control
Search Control
µ-Com Data I/O Controller
16-bit Shift Register
Disc (CD) Data Buffer Memory
ASEC
AMIN
FRAME
SEC
MIN
X
TNO
ADR
CONTROL
CRC Check Data Buffer
Location Memory Area
TNO1 TNO2 TNO3 TNO4 TNO5 TNO6 TNO7 TNO8 TNO9 TNO10 TNO11 TNO12
MIN
SEC
PC0
PC1
PC2
PC3
PE0
PE1
PE2
PE3
PB0
PB1
PB2
PB3/CT
PD3
PD2
PD1
PD0
PA3
PA2
PA1
PA0
PF0
PF1
PF2
PF3
RES
X1
X2
TEST
GNG
SO
SI
SCK
PH3
PH2
PH1
PH0
PG3
PG2
PG1
PG0
RA501
RA502
RA503
R519 5.6K
R508 1K
IC504
IC504 LC4011B
R522 10K
R521 47K
C521 0.0022
N-HOP READY
Z-CROSS
COMP-2
COMP-1
INT
LASER ON
HFOK
MRON
F-S/OPEN
D521 GMA01
PAUSE
P-HOP
RESET
CN8
TO SERVO & EQUALIZER P.C.B
CN9
TO SYSTEM CONTROL P.C.B

WIRING DIAGRAM ② (PICKUP/SERVO/SYSTEM CONTROL/DISPLAY)

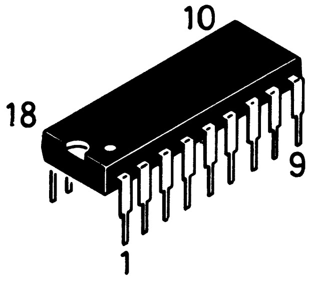
IC40 ....LM6402H



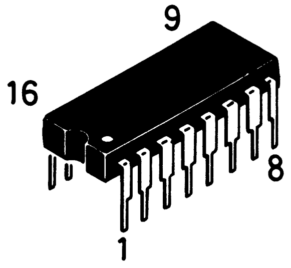
IC201..........LA9100



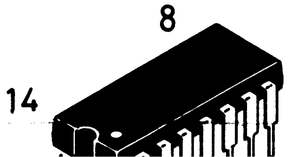
IC301, 302....LB1240

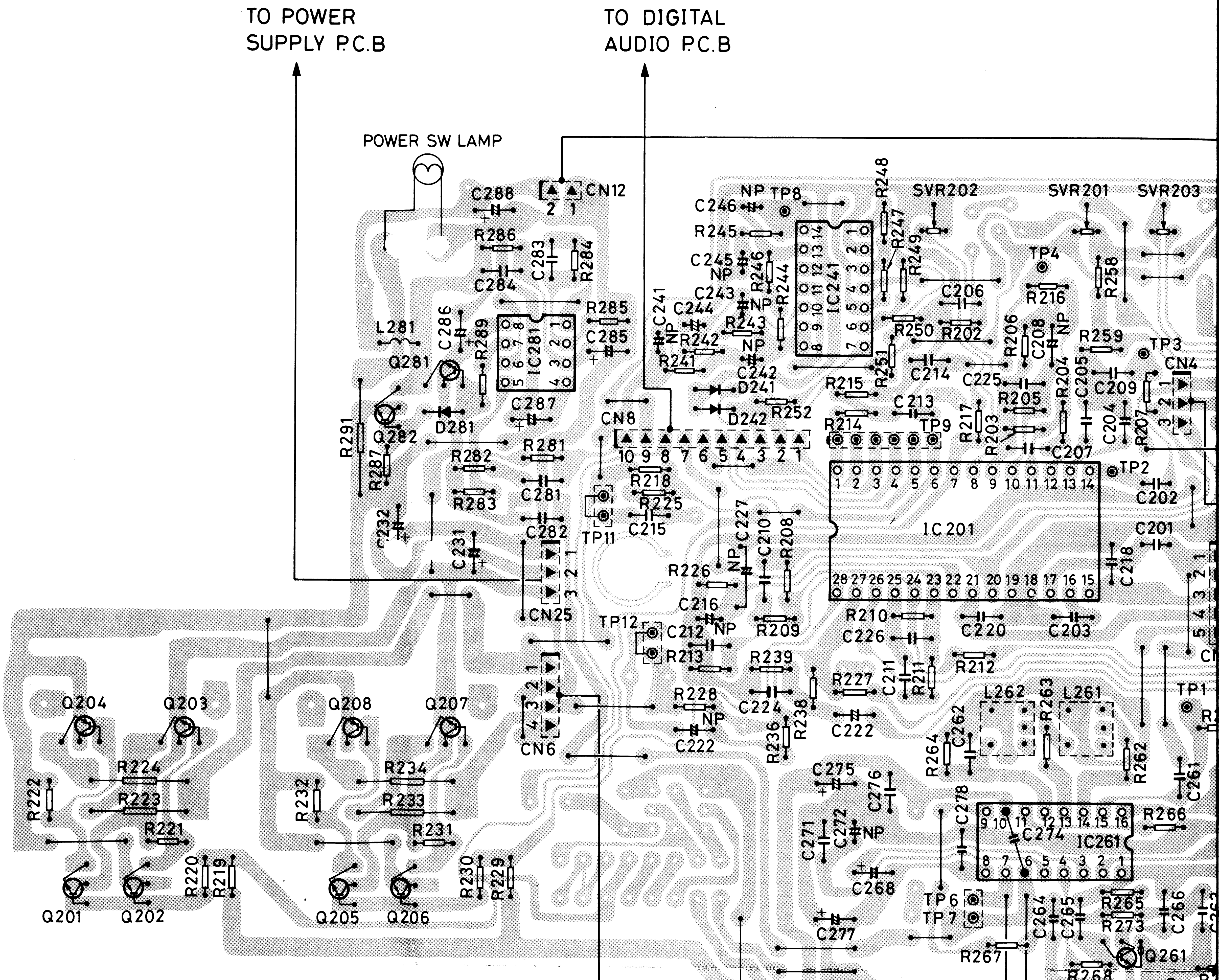


IC101............LA9000
IC303, 304....LB1275
IC261 ....LA 9010

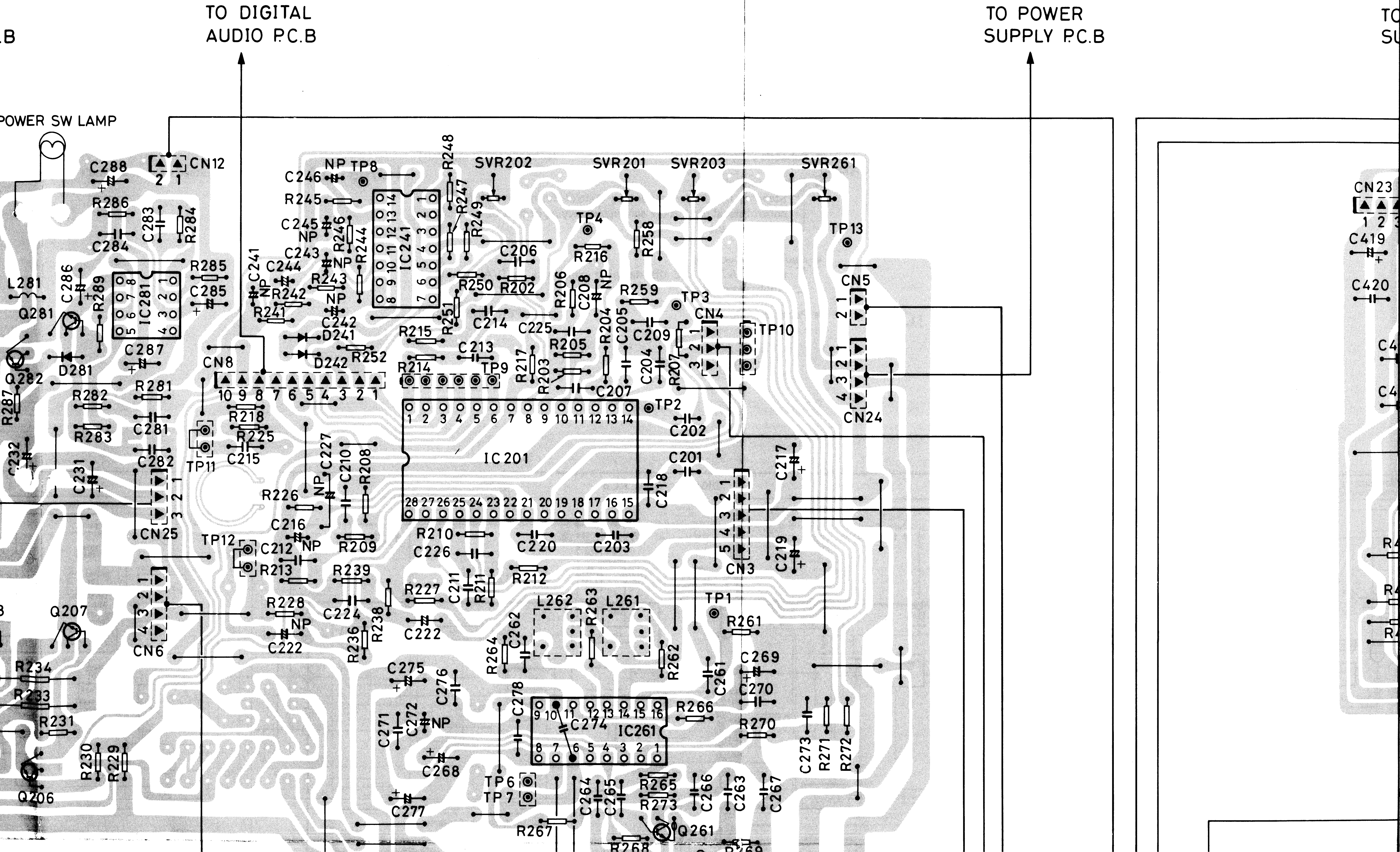


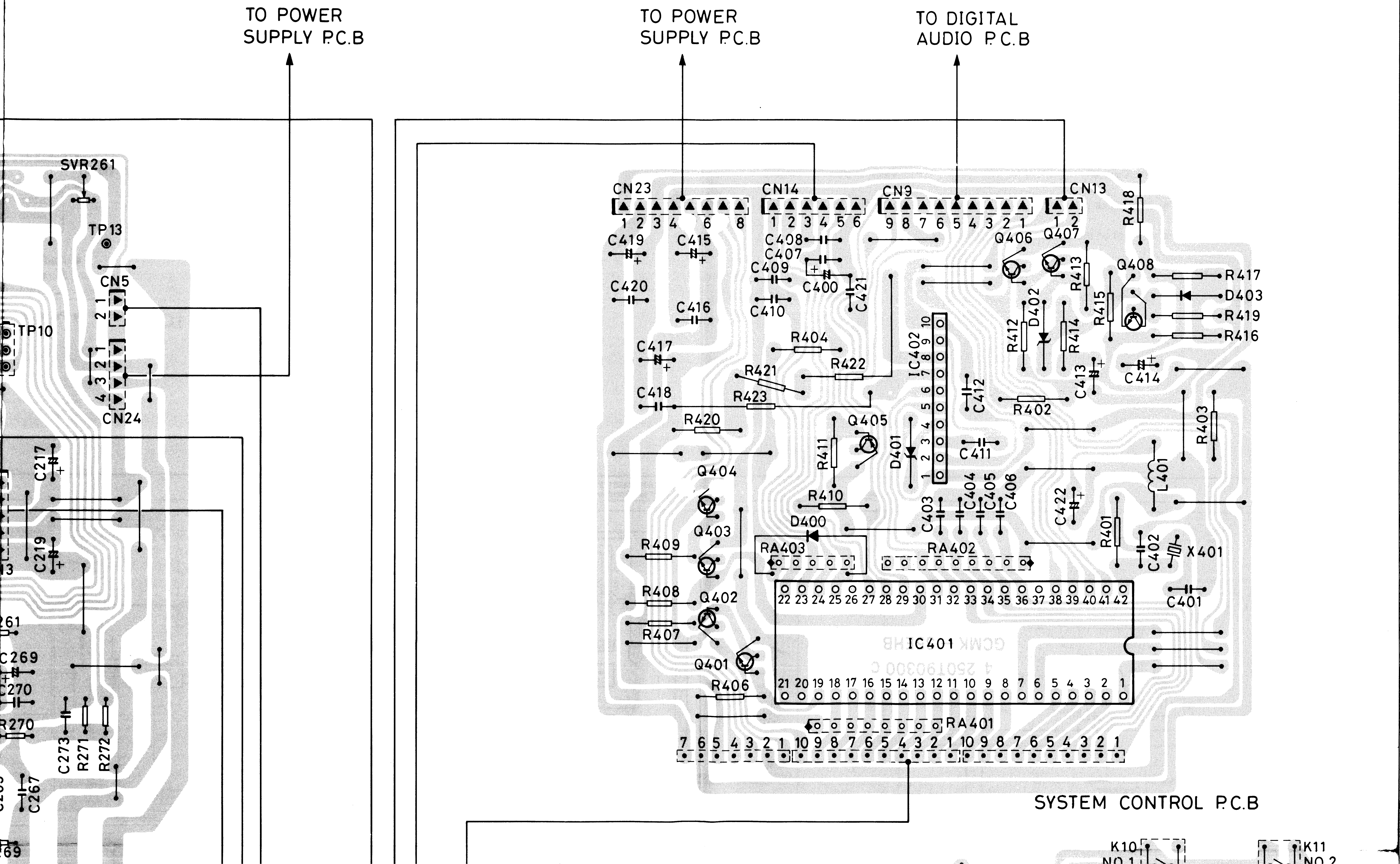
IC241.........LA6324

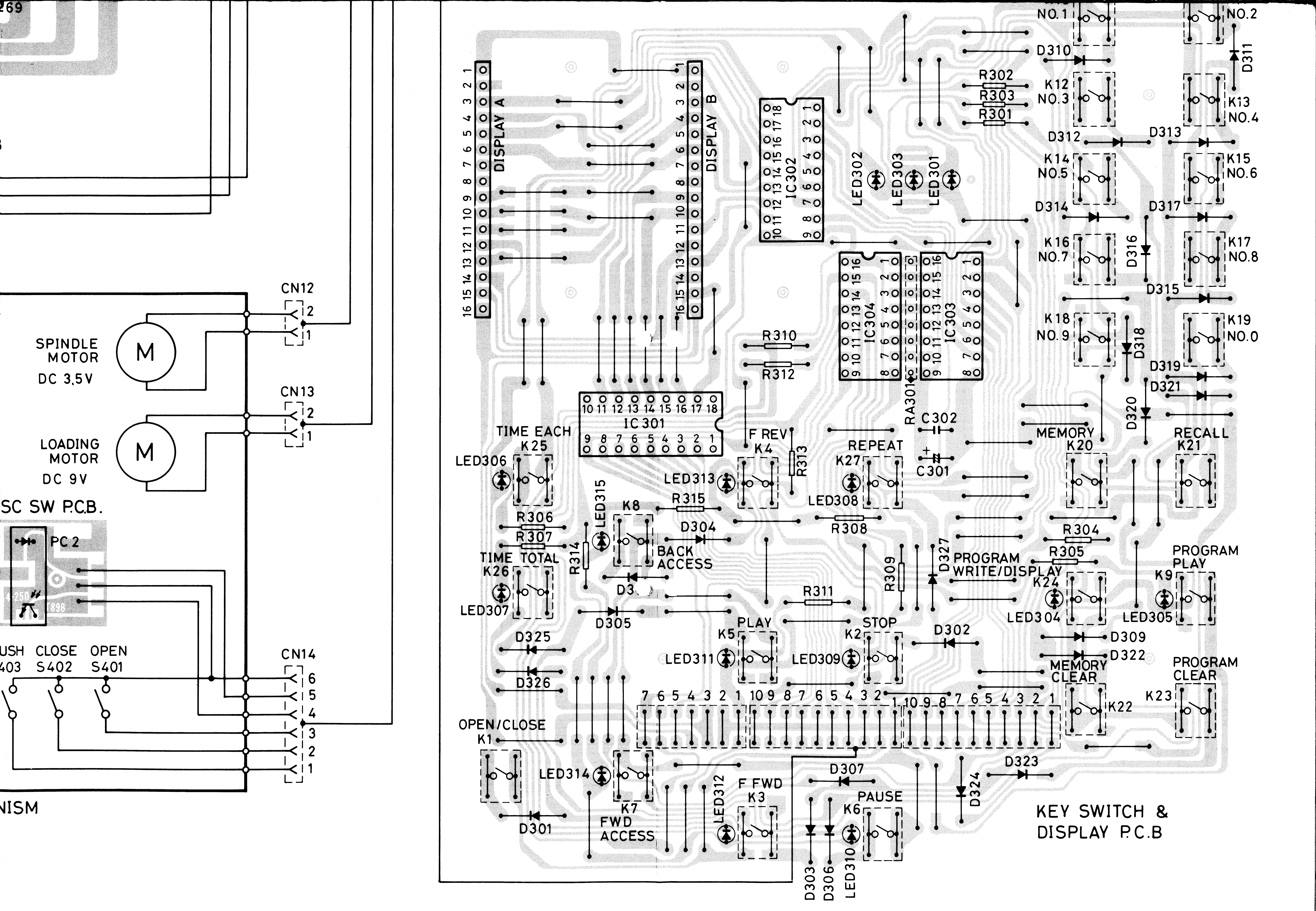


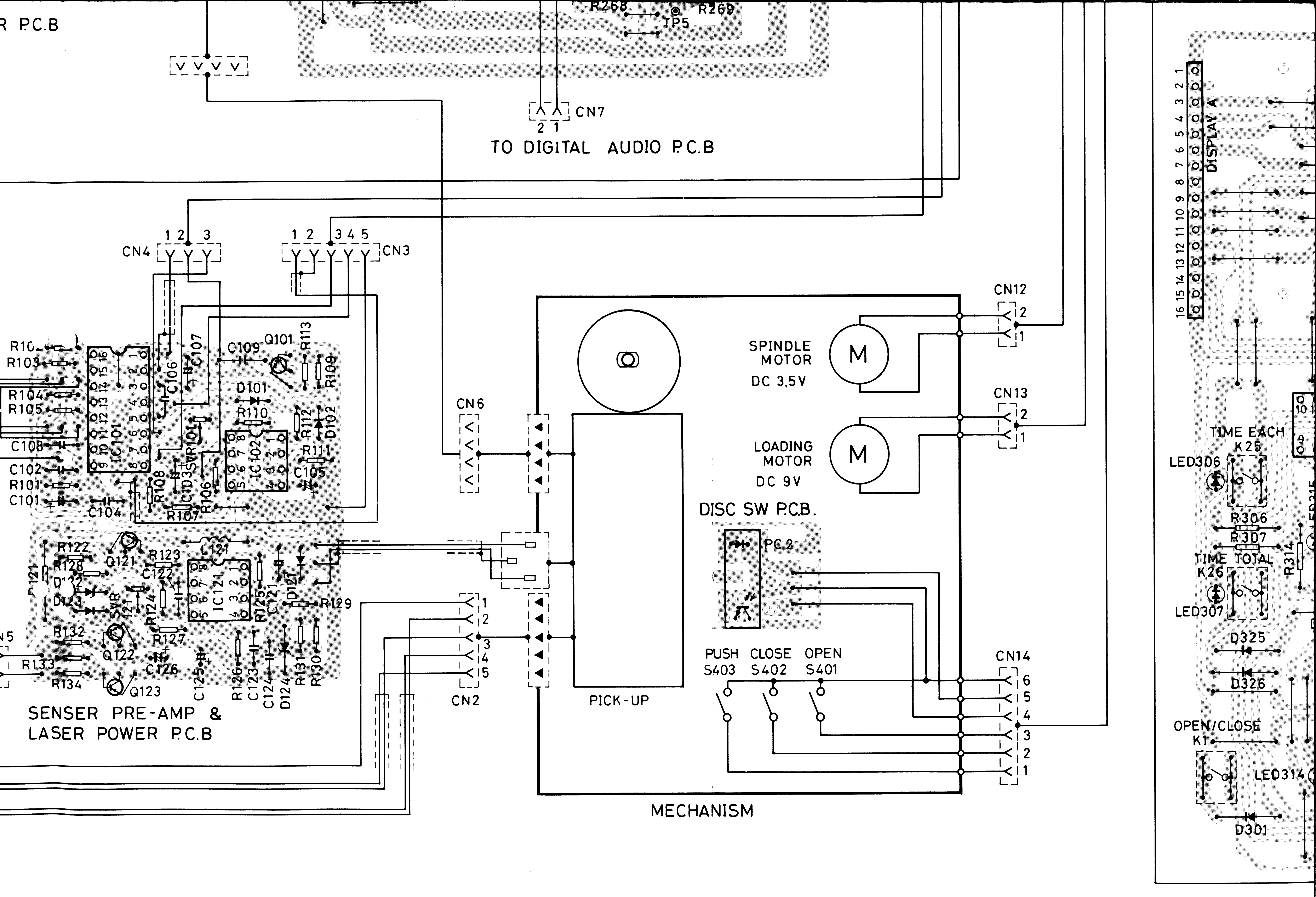

TO POWER SUPPLY P.C.B
TO DIGITAL AUDIO P.C.B
POWER SW LAMP
C288
CN12
2 1
R286
C283
R284
C284
L281
C286
R289
IC281
R285
C285
Q281
R291
Q282
D281
C287
R287
R282
R281
R283
C281
C232
C231
C282
CN25
TP11
C246
NP
TP8
R245
C245
R246
R244
C243
C244
C241
R243
R242
R241
C242
D241
D242
R252
CN8
10 9 8 7 6 5 4 3 2 1
R218
R225
C215
IC241
R248
R247
R249
SVR202
SVR201
SVR203
TP4
R258
R216
C206
R250
R202
R251
C214
R206
C208
R204
R259
TP3
CN4
R215
C213
R214
TP9
R217
R203
C225
R205
C205
C209
C204
R207
C207
TP2
C202
IC201
1 2 3 4 5 6 7 8 9 10 11 12 13 14
28 27 26 25 24 23 22 21 20 19 18 17 16 15
C201
C218
C227
C210
R208
R226
C216
TP12
C212
R213
R209
R210
C226
C220
C203
C211
R211
R212
R239
R227
C224
R238
R228
C222
R236
L262
L261
R263
R264
C262
R262
TP1
C261
C275
C276
C271
C272
C278
C274
IC261
R266
9 10 11 12 13 14 15 16
8 7 6 5 4 3 2 1
C268
TP6
TP7
C277
R267
C264
C265
R265
R273
C266
Q261
R268
CN6
Q204
Q203
Q208
Q207
R224
R223
R222
R221
R234
R233
R232
R231
R220
R219
R230
R229
Q201
Q202
Q205
Q206

SYSTEM CONTROL/DISPLAY)

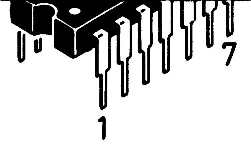

.B
TO DIGITAL AUDIO P.C.B
TO POWER SUPPLY P.C.B
TO
SU
POWER SW LAMP
CN12
C288
R286
C283
R284
C284
L281
C286
R289
IC281
Q281
D281
Q282
R287
R282
R283
R281
C281
C282
C287
R285
C285
C232
C231
CN25
CN6
Q207
R234
R233
R231
R230
R229
Q206
C246
NP
TP8
R245
C245
C243
C244
C241
R246
R244
R243
R242
R241
C242
D241
D242
R252
IC241
R248
R247
R249
R250
R251
SVR202
C206
R202
C214
R215
R214
C213
TP9
CN8
R218
R225
C215
TP11
C227
C210
R208
R226
C216
TP12
C212
R213
R209
R239
C224
R238
R236
R228
C222
R210
C226
C220
C203
C211
R211
R227
R212
IC201
TP2
C202
C201
C218
SVR201
SVR203
TP4
R258
R216
R206
C208
R259
TP3
CN4
TP10
C225
R205
R204
C205
C209
R217
R203
C207
C204
R207
SVR261
TP13
CN5
CN24
CN3
C217
C219
TP1
R261
L262
R263
L261
R264
C262
R262
C261
C269
C270
C275
C276
C278
C271
C272
C268
C277
IC261
C274
R266
R270
C273
R271
R272
TP6
TP7
C264
C265
R265
R273
C266
C263
C267
R267
R268
Q261
R269
CN23
C419
C420


TO POWER SUPPLY P.C.B
TO POWER SUPPLY P.C.B
TO DIGITAL AUDIO P.C.B
SVR261
TP13
CN5
TP10
CN24
C217
C219
C269
C270
R270
C273
R271
R272
C267
CN23
CN14
CN9
CN13
R418
C419
C415
C408
C407
C409
C400
C421
C410
C420
C416
Q406
Q407
Q408
R413
R415
R417
D403
R419
R416
D402
R412
R414
C417
R404
R421
R422
IC402
C413
C414
C418
R423
C412
R402
R420
Q405
R411
D401
C411
R403
L401
Q404
R410
C403
C404
C405
C406
C422
D400
Q403
R401
R409
RA403
RA402
C402
X401
C401
R408
Q402
R407
IC401
Q401
R406
RA401
SYSTEM CONTROL P.C.B
K10
NO.1
K11
NO.2

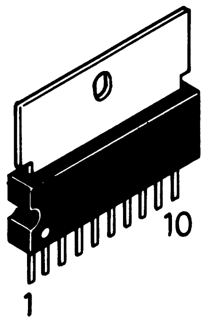

269
CN12
SPINDLE MOTOR
DC 3,5V
M
CN13
LOADING MOTOR
DC 9V
M
SC SW P.C.B.
PC 2
CN14
USH
403
CLOSE
S402
OPEN
S401
NISM
DISPLAY A
DISPLAY B
IC302
IC301
IC304
IC303
LED302
LED303
LED301
RA301
C302
C301
R302
R303
R301
R310
R312
R313
R315
R306
R307
R314
R308
R309
R311
R304
R305
NO.1
NO.2
D310
D311
K12
NO.3
K13
NO.4
D312
D313
K14
NO.5
K15
NO.6
D314
D317
K16
NO.7
D316
K17
NO.8
D315
K18
NO.9
D318
K19
NO.0
D319
D321
D320
TIME EACH
K25
LED306
F REV
K4
LED313
REPEAT
K27
LED308
MEMORY
K20
RECALL
K21
LED315
K8
D304
BACK ACCESS
TIME TOTAL
K26
LED307
D3
D305
D327
PROGRAM WRITE/DISPLAY
K24
LED304
PROGRAM PLAY
K9
LED305
D325
D326
PLAY
K5
LED311
STOP
K2
LED309
D302
D309
D322
MEMORY CLEAR
K22
PROGRAM CLEAR
K23
OPEN/CLOSE
K1
LED314
K7
FWD ACCESS
D301
LED312
F FWD
K3
D307
D303
D306
LED310
PAUSE
K6
D324
D323
KEY SWITCH & DISPLAY P.C.B



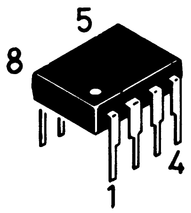
R P.C.B
R268
TP5
R269
CN7
2 1
TO DIGITAL AUDIO P.C.B
CN4
1 2 3
1 2 3 4 5
CN3
R103
R104
R105
C108
C102
R101
C101
IC101
C106
C107
C109
Q101
R113
R109
D101
R110
R112
D102
SVR101
IC102
R111
C105
C103
R108
R106
C104
R107
R122
Q121
R123
L121
R128
C122
IC121
R125
C121
D121
R129
D122
D123
SVR 121
R124
R132
R127
Q122
R133
C126
R134
Q123
C125
R126
C123
C124
D124
R131
R130
R121
N5
SENSER PRE-AMP &
LASER POWER P.C.B
CN6
CN2
1
2
3
4
5
PICK-UP
MECHANISM
CN12
2
1
SPINDLE MOTOR
DC 3,5V
M
CN13
2
1
LOADING MOTOR
DC 9V
M
DISC SW P.C.B.
PC 2
PUSH S403
CLOSE S402
OPEN S401
CN14
6
5
4
3
2
1
DISPLAY A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
TIME EACH K25
LED306
R306
R307
TIME TOTAL K26
R314
LED307
D325
D326
OPEN/CLOSE K1
LED314
D301
LED315
10
9



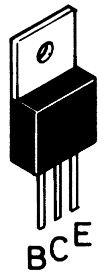
IC402..........BA6109



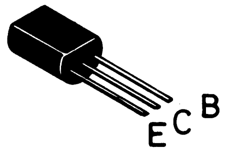
IC281........LA6458D
IC102..........NJM4558DD
IC121..........LA6358



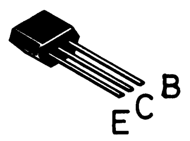
Q203, 207......2SD613
Q204, 208......2SB633



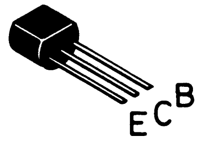
Q201, 205......2SD438
Q202, 206......2SB560



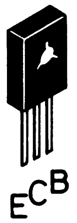
Q101..........2SC536
Q123, 405......2SA608

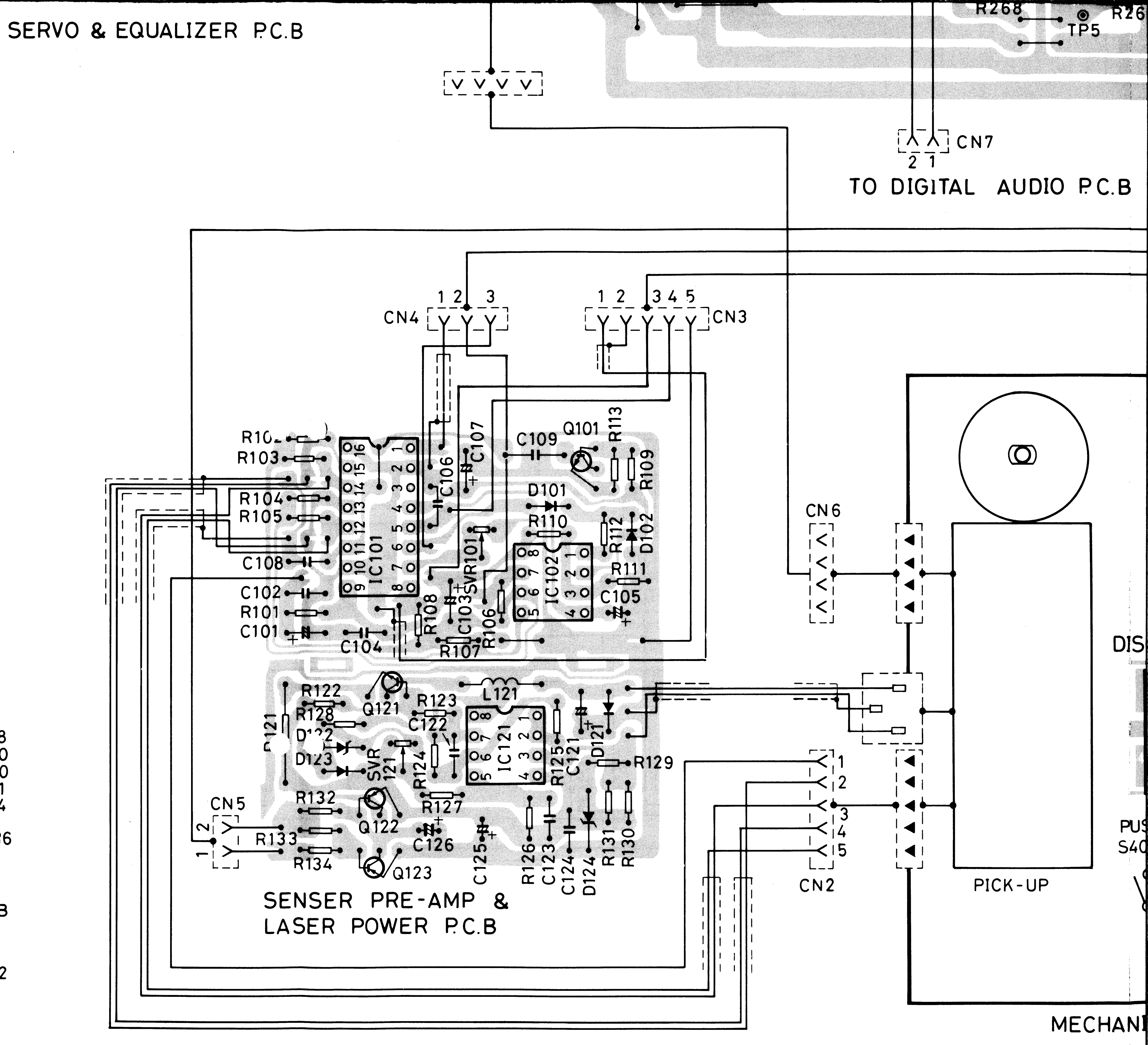


Q122.............2SB598
Q261.............2SC930
Q281.............2SD600
Q282.............2SB631
Q402, 404.........2SD734
Q401, 403, 406
407, 408.........2SC536



Q121.............2SD612




SERVO & EQUALIZER P.C.B
R268
TP5
R26
CN7
2 1
TO DIGITAL AUDIO P.C.B
CN4
1 2 3
CN3
1 2 3 4 5
R10
R103
R104
R105
C108
C102
R101
C101
C104
IC101
C106
C107
C109
Q101
R113
R109
D101
R110
R112
D102
SVR101
IC102
R111
C105
R108
C103
R106
R107
R122
Q121
R123
L121
R128
C122
R121
D122
D123
SVR 121
R124
IC121
R125
C121
D121
R129
R132
R127
Q122
R133
C126
C125
R134
Q123
R126
C123
C124
D124
R131
R130
CN5
1 2
SENSER PRE-AMP & LASER POWER P.C.B
CN6
CN2
1
2
3
4
5
PICK-UP
DIS
PUS
S40
MECHANI